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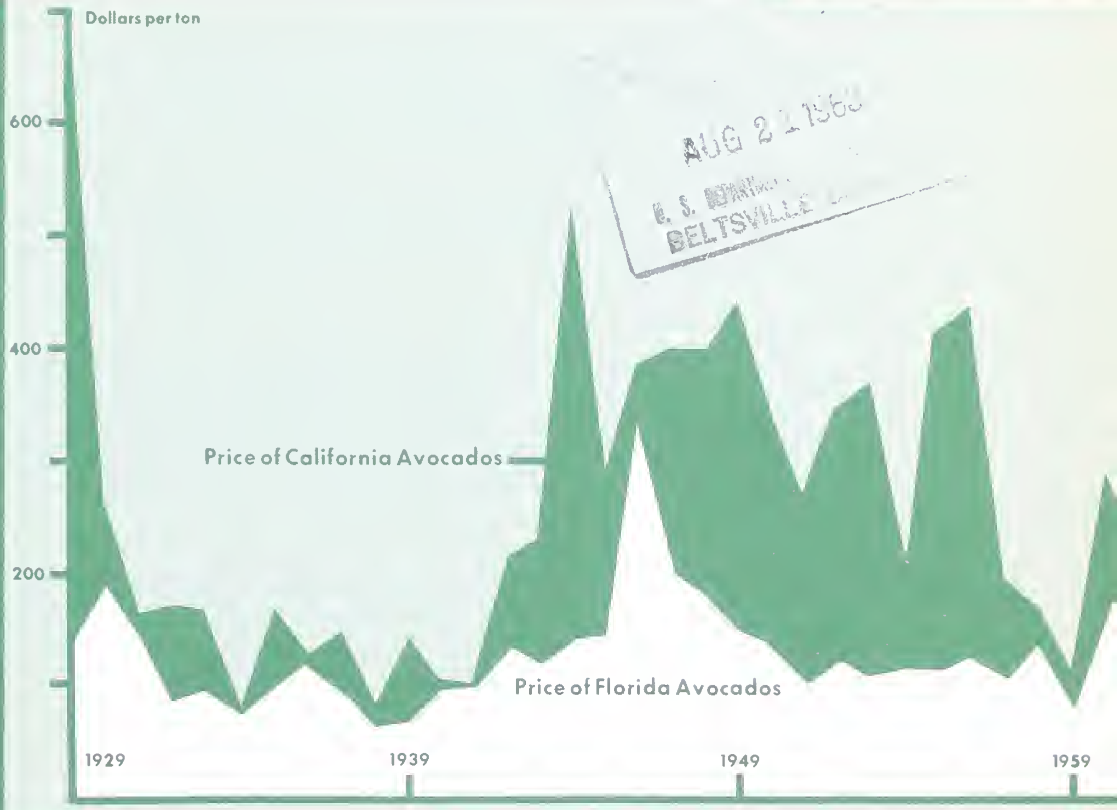
Economic Aspects of Marketing Florida Avocados



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BELTSVILLE

by Clyde B. Markeson
Farmer Cooperative Service
U. S. Department of Agriculture

August 1963
Marketing Research Report 614

FARMER COOPERATIVE SERVICE
U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON 25, D. C.

Joseph G. Knapp, Administrator

The Farmer Cooperative Service conducts research studies and service activities of assistance to farmers in connection with cooperatives engaged in marketing farm products, purchasing farm supplies, and supplying business services. The work of the Service relates to problems of management, organization, policies, financing, merchandising, product quality, costs, efficiency, and membership.

The Service publishes the results of such studies; confers and advises with officials of farmer cooperatives; and works with educational agencies, cooperatives, and others in the dissemination of information relating to cooperative principles and practices.

This study was conducted under authority of the Agricultural Marketing Act of 1946 (RMA Title II).

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HIGHLIGHTS

This publication reports on a study designed to help all segments of the Florida avocado industry better understand their economic position in marketing their crop.

The report first points out some significant characteristics and trends of the avocado industry in the United States and evaluates their probable meaning to growers and shippers in Florida. It then examines the relationship between some of these factors and prices received by industry members.

The remainder of the report evaluates industrywide attempts to improve marketing and suggests possible improvements in practices and methods to help increase returns to growers and shippers.

Findings of this study showed that many economic factors could have given rise to growers' and shippers' discontent with the results of previous years' operations. Important among these were:

1. Large fluctuations in production from one season to the next.
2. Increasing competition from larger production units in California.
3. Consumers' unfamiliarity with avocados.
4. Little, if any, coordination of sales activity at both the grower and shipping point levels.
5. Limited total marketings, which because of the demand characteristics for avocados, may have resulted in reduced total returns to the industry.

While industrywide programs have stabilized some elements of marketing, none have had as their primary objective coordination of harvesting, distribution, and promotional activities.

Consequently, growers, operating independently of each other, have harvested in accordance with maturity regulations rather than marketing needs.

Shippers, operating independently of each other, have oversupplied some markets while undersupplying others. And promotional activities undertaken independently of harvesting and sales decisions have led to difficulties in fulfilling commitments.

Consolidating sales among shippers and forming a marketing cooperative among growers are two possible ways of coping with these weaknesses.

This report also examines possible benefits to the industry from (1) establishing and maintaining a central source of complete and up-to-date information on production, (2) establishing a marketing information service, (3) reexamining advertising and promotional activities as techniques for increasing consumption, and (4) maintaining rigid control over quality.

ECONOMIC ASPECTS OF MARKETING FLORIDA AVOCADOS

by Clyde B. Markeson

Marketing Division

Over the past three decades producers and shippers of avocados in Florida have experienced a wide range of economic problems. These have included marked changes in production from one year to the next and increasing competition from larger individual producing units in California. In addition, avocado consumption is at a rather low level from the viewpoint of industry members. These factors, in conjunction with prevailing marketing practices and methods, have often resulted in prices below cost of production for some growers and below cost of distribution for some shippers.

Because of these conditions and in hope of obtaining a more orderly distribution of future crops at improved prices, producers and handlers voted to establish a Federal marketing agreement and order program in 1954. The following year the Florida Avocado and Lime Commission was organized. The Federal program was designed to bring about the marketing of a more uniform product, and the commission was designed to promote its sale.

To supplement these activities, leaders requested research on maturity and quality standards, containers, and various phases of marketing. In 1955, Farmer Cooperative Service was requested to initiate a study of marketing practices and methods associated with unsatisfactory returns. In 1957, FCS issued a progress report to assist the industry in formulating plans for the 1957-58 season.

That study helped identify what growers and shippers considered specific causes of unsatisfactory marketing conditions. Moreover, the nature of their responses to and experiences with the agreement and order program clearly suggested the need for additional evaluation.

The objectives of this report, therefore, are: (1) To present a more detailed and up-to-date analysis of some problem areas outlined in the preliminary progress report, (2) to summarize and evaluate industrywide attempts to improve marketing since 1954, and (3) to suggest further modifications in marketing practices and methods that may help growers and shippers obtain improved returns.

To accomplish these objectives, this report first discusses in a general way some factors affecting the supply of and demand for avocados. These include Florida and California production, imports, consumption, and distribution of sales over the marketing season by origin of supply. Major attention is directed toward finding out what differences exist between Florida and California--the two States that comprise the commercial avocado industry in the United States--and how these differences affect growers and shippers in Florida.

Acknowledgment--The author wishes to express his appreciation to Anthony Rojko and Hyman Weingarten, Economic Research Service, U.S. Department of Agriculture, for their suggestions and technical assistance in preparing the price section of this report.

The latter portion of the first section of this report measures the relationship between changes in production per capita, disposable income per capita, and imports per capita on prices received by producers. Coefficients for each analysis are given and their significance to industry members in Florida and California explained.

Results of the price analysis can be useful to producers, shippers, and distributors of avocados in both Florida and California. The analysis shows that both states have an opportunity to increase gross returns from the sale of this fruit. Students of avocado marketing will be interested in the proportions of price variability accounted for by the statistical function. This information, along with the equation used for each analysis and the figures referred to in the text, is shown at the bottom of each table.

The second section of this report evaluates 7 years of industrywide attempts to improve marketing and increase sales of Florida avocados. It examines various regulations of the marketing agreement and order program and discusses briefly the Florida Avocado and Lime Council. It also includes information on the Florida Avocado and Lime Commission.

The third and concluding section summarizes a number of economic factors which could have given rise to growers' and shippers' discontent with the results of previous years' operations. Findings in prior sections of the report are drawn upon to develop the type of program needed to coordinate harvesting, distribution, and promotional activities.

ECONOMIC RELATIONSHIPS AFFECTING FLORIDA'S COMPETITIVE POSITION

A review of various characteristics and trends of the avocado industry highlights some economic factors bearing on Florida's competitive position. It also points up the factors to be evaluated in more detail in the remaining sections of the report.

Over the years, avocado production in the United States has steadily increased, but Florida's share of the total has been declining. In 1929, Florida and California each accounted for about 50 percent of total domestic commercial production. By 1961, Florida's share had declined to 10 percent. In addition, high land prices and taxes have discouraged plantings in Dade County, the most important producing area in Florida.

The comparatively large percentage of homemakers who have never heard of avocados may have presented another problem for growers and shippers in Florida. According to a consumer survey made in 1957, about one in six respondents in areas encompassing Florida's major markets replied that they had never heard of this fruit (1).[1] In contrast, only 2 percent of those interviewed in California's major market area gave this response.

Coupled with Florida's declining position productionwise and homemakers' comparative unfamiliarity with the product has been an uncoordinated system of distribution. Selling decisions at both the grower and shipping-point levels in Florida are made on an individual basis--resulting in an oversupply of fruit in some markets, an undersupply in others, and unstable prices. Growers in California, on the other hand, are more highly organized and this has helped them develop a more orderly system of distribution.

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[1] Figures in parentheses and underscored refer to literature cited, page 38.

The Florida avocado industry may have further accentuated its marketing problems by having as a goal improved prices through eliminating culls rather than income maintenance and growth through market expansion techniques.

These factors and developments, while they have a different impact upon each participant, are some of the economic problems affecting the current and prospective status of the Florida avocado industry in the aggregate.

A more detailed identification of these areas, and their resulting implication to growers and shippers in Florida, are presented under four major headings:

- Sources of Supply
- Utilization and Consumption
- Distribution of Sales
- Prices

Sources of Supply

Principal sources of avocado supplies moving into domestic consumption channels consist of production from Florida and California plus imports (table 1). The total quantity available for consumption has markedly increased since 1929 and during the period 1957-61 was nearly 10 times that of 1929-33.

Before 1933, imports constituted the bulk of avocados consumed in the United States. Imports reached a high of 5,854 tons in 1940, decreased sharply during the war years, and since 1945 have averaged 3,124 tons a year. Percentagewise, imports represented 35 percent of the total United States supply from 1929-41 and 8 percent from 1946-61. Wartime shipping restrictions, trade agreements, import duties, and import regulations are primary reasons for the declining importation of this fruit into the United States.

The following two sections, "Domestic Production" and "Imports," will summarize certain basic economic factors affecting the total supply of avocados--including the changing pattern of production and imports, the shift toward concentration and specialization of domestic commercial production, and the implication of these changes to growers and shippers in Florida.

Domestic Production

Avocado production in the United States has undergone some striking changes in the past three decades. Except for 12 years when there were decreases from previous years, the total supply of domestically produced avocados has steadily increased since the late 1920's and in 1959 reached an alltime high of 78,000 tons. This was 22,400 tons more than the previous year's crop and 16,900 tons more than the former record established 2 years earlier. The 1961 crop, while not establishing a record, was among the highest five.

Accompanying the increased production have been wide fluctuations from year to year, with the change becoming more pronounced over the years. This picture is outlined in figure 1, which shows annual production and the long-term trend over a 33-year period.

Three factors affecting the production trend have been the tendency of the important varieties to bear heavily only every other year, climatic conditions, and an increase in the number of bearing trees.

Production Tends To Alternate.--Avocados are divided into three races for horticultural purposes--West Indian, Guatemalan, and Mexican--plus a number of hybrid varieties, each native to Central America and adjacent portions of North America and South America. West Indian varieties formerly predominated in Florida but, in recent years, Guatemalan-West Indian hybrids have predominated. Lulu, a Guatemalan variety, has accounted for about one-fourth of Florida's total production since

Table 1. --Avocado production, imports, and supply, United States, 1929-1961

Year	Domestic avocado production[1]			Avocado imports[2]	Total United States supply
	Florida	California	Florida and California		
	Tons	*Tons*	*Tons*	*Tons*	*Tons*
1929	420	400	820	3, 372	4, 192
1930	620	2, 150	2, 770	4, 896	7, 666
1931	820	2, 600	3, 420	5, 097	8, 517
1932	1, 400	1, 700	3, 100	4, 340	7, 440
1933	2, 200	2, 500	4, 700	2, 632	7, 332
1934	2, 000	9, 300	11, 300	2, 811	14, 111
1935	1, 000	5, 200	6, 200	3, 765	9, 965
1936	600	6, 200	6, 800	4, 559	11, 359
1937	2, 000	5, 300	7, 300	5, 692	12, 992
1938	2, 100	14, 900	17, 000	5, 158	22, 158
1939	2, 200	7, 800	10, 000	3, 692	13, 692
1940	880	14, 600	15, 480	5, 854	21, 334
1941	1, 250	18, 600	19, 850	5, 342	25, 192
1942	2, 100	15, 600	17, 700	865	18, 565
1943	4, 600	21, 300	25, 900	1, 718	27, 618
1944	5, 800	11, 600	17, 400	1, 018	18, 418
1945	3, 200	24, 000	27, 200	446	27, 646
1946	1, 600	18, 500	20, 100	2, 444	22, 544
1947	2, 300	18, 600	20, 900	2, 993	23, 893
1948	3, 100	14, 400	17, 500	3, 763	21, 263
1949	5, 000	15, 500	20, 500	3, 206	23, 706
1950	5, 500	22, 400	27, 900	3, 944	31, 844
1951	6, 500	28, 000	34, 500	4, 586	39, 086
1952	8, 700	23, 200	31, 900	3, 460	35, 360
1953	10, 600	21, 300	31, 900	4, 138	36, 038
1954	11, 800	45, 200	57, 000	3, 698	60, 698
1955	14, 300	20, 000	34, 300	2, 671	36, 971
1956	10, 800	15, 800	26, 600	3, 304	29, 904
1957	14, 800	46, 300	61, 100	2, 860	63, 960
1958	4, 100	51, 500	55, 600	3, 385	58, 985
1959	8, 000	70, 000	78, 000	4, 382	82, 382
1960	1, 800	35, 500	37, 300	1, 073	38, 373
1961	5, 600	50, 000	55, 600	84	55, 684

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[1] Compiled from annual reports, U. S. Dept. of Agr.
[2] Compiled from annual reports, U. S. Dept. of Com.

1955. Lulu and nine other varieties, including Booth 1, Booth 3, Booth 7, Booth 8, Waldin, Pollock, Hichson, Taylor, and Trapp, have accounted for about 85 percent of the total.

California production consists mostly of Guatemalan varieties and Mexican-Guatemalan hybrids (7). Fuerte, a Mexican-Guatemalan hybrid, presently accounts for approximately 60 percent of California's production and has been the leading variety since 1927.

Trees of the Guatemalan race are characterized by an alternate bearing tendency. That is, in any one season, the trees are either in an on-crop or off-crop condition, depending upon yields the previous year. This means that if a tree yields a large crop in one production period it is not likely to produce another large crop until at least one growing season has elapsed. Rather, the usual pattern is for high or fair yields to be followed by light or medium yields. Since most full-bearing trees in a district are generally in the same crop condition, marked alternations in production result from season to season.

Temperature conditions also influence the crop size. With trees in one or the other phase

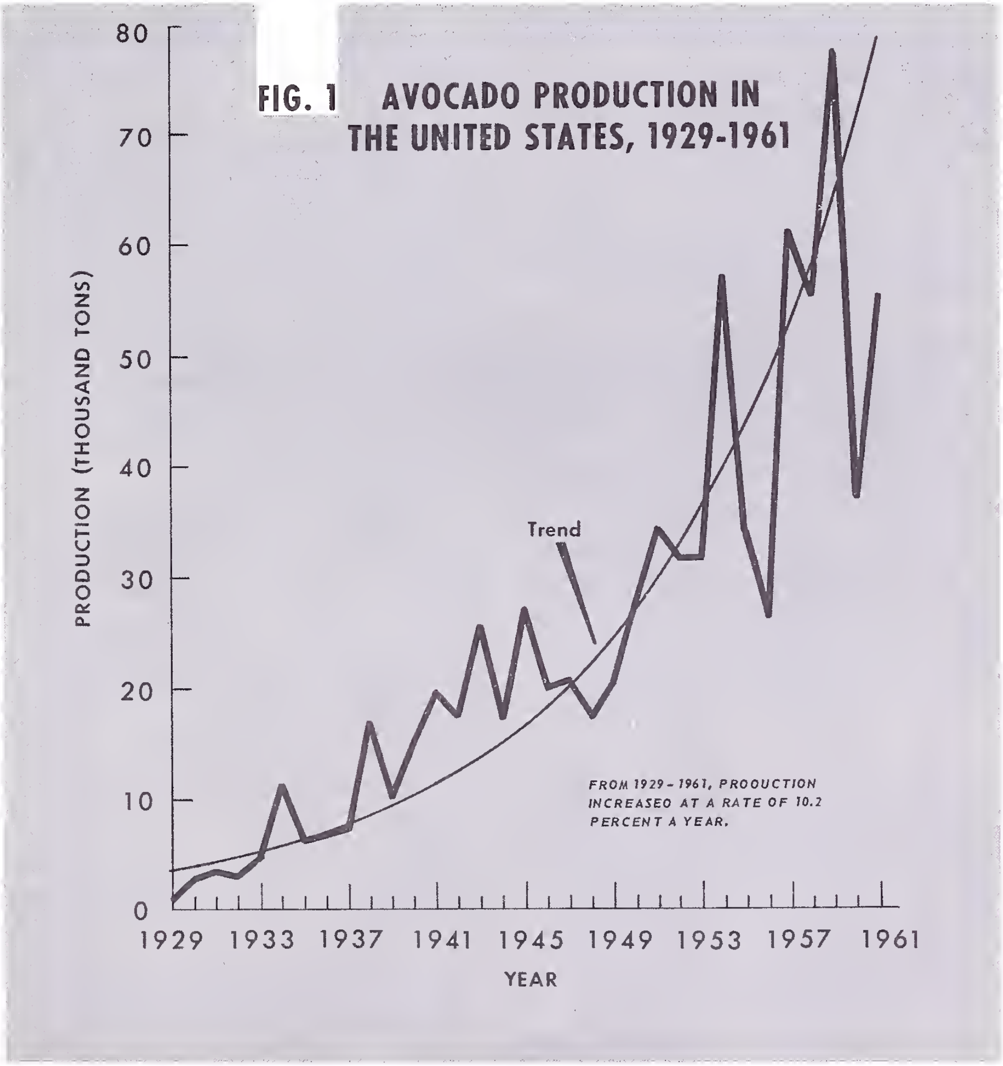

FIG. 1 AVOCADO PRODUCTION IN THE UNITED STATES, 1929-1961

FROM 1929-1961, PRODUCTION INCREASED AT A RATE OF 10.2 PERCENT A YEAR.

Table 2.--Number of avocado trees of bearing age, by selected census periods, United States

State	Number of bearing avocado trees, census of--			
	1930	1940	1950	1959
Florida	130,376	86,195	213,665	413,199
California	131,413	663,917	781,745	1,620,212
Total	261,789	750,112	995,410	2,033,411

of production and climatic conditions either favorable or unfavorable, four possible combinations of crop prospects are possible (4).

1. On-crop phase and favorable temperatures result in a crop ranging from large to very large.
2. On-crop phase and unfavorable temperatures result in a crop ranging from medium to light.
3. Off-crop phase and favorable temperatures result in a crop ranging from light to medium.
4. Off-crop phase and unfavorable temperatures result in a crop ranging from light to complete failure.

Number of Bearing Trees Increasing.--Another factor contributing to pronounced changes in production from year to year and to the upward trend over the years has been an increase in the number of bearing trees (table 2). The total number increased an average of 69 percent in Florida and 177 percent in California between successive census periods.

In Florida, the largest change was between 1940 and 1950 an increase of 148 percent. California's greatest change occurred between 1930 and 1940 when the total number increased 405 percent. These increases, in conjunction with the alternate bearing tendency and temperature changes, explain why fluctuations in the crop have become more extreme over the years.

Rate of Change Over Three Decades.--According to the trend analysis, which took into consideration that production in one season served as a basis for determining crop prospects the following season, avocado production in the United States increased at an average rate of 10.2 percent a year during the period 1929-61.[2]

Florida Production.--Although budded trees were planted near Miami in 1906, it was not until 1929 that Florida became an important commercial producing area. In that year its output of 420 tons represented 51 percent of the domestic crop. Production steadily increased with an alltime high of 14,800 tons established in 1957. A severe freeze in December of that year and other adverse weather conditions thereafter contributed to a rapid decline the following seasons.

In 1959, 34 of Florida's 67 counties reported avocado production. The most important of these were Dade, Highlands, Brevard, Polk, and Pinellas, respectively. The smallest groves were reported in Citrus, Duval, and Washington counties. Of the total quantity, Dade produced nearly 99 percent and Highlands one-half of 1 percent. These proportions were derived from the data shown in appendix table 1.

Dooryard plantings can be found scattered throughout the southern part of the State, especially in Tampa, Fort Myers, West Palm Beach, and Orlando. Scattered single trees are found in the peninsula as far north as St. Augustine and Gainesville (6).

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[2] The constants a and b for the function $y = ab^x$ were fitted by the method of least squares. The resulting equation was $y = 3.18757 (1.101985)^x$.

Trend Toward Commercialization and Specialization.--A comparison of data by census periods shows that production of avocados in Florida has become more commercialized and specialized over the years.

Strict comparability between the 1959 census and those of previous periods is precluded due to a change in definition of a farm. This may slightly overemphasize the shift toward commercialization and specialization between 1950 and 1959, since the reduction in the total number of Florida farms was 6.8 percent and of Dade County farms, 7.6 percent.

In 1930, 823 of 58,966 Florida farms--one of every 72--reported avocado production (table 3). On the average, these farms produced 557 pounds of fruit on 158 bearing trees. By 1959, the proportion of Florida farms reporting production had increased to one out of 25. These farms produced an average of nearly 11,500 pounds on 233 bearing trees. Between the two periods, the total number of trees per farm increased from 221 to 253.

Commercialization and increasing specialization with larger individual producing units becomes more apparent when Dade County figures are compared with State data. In 1930, 28 percent of the total number of farms in this district accounted for 60 percent of the State's production. These farms, on the average, produced 852 pounds of avocados on 351 bearing trees. In 1959, slightly less than half the farms in this county accounted for 99 percent of Florida's production. These farms produced an average of nearly 38,000 pounds on 756 bearing trees. Over the period, the total number of trees per farm increased from an average of 457 to 816.

Ratio of Nonbearing to Bearing Trees.--An important factor determining the probable

Table 3.--Commercial avocado production in Florida, by selected census periods

Production area and item	Commercial avocado production, census of--			
	1930	1940	1950	1959
Florida				
Total number of farms	58, 966	62, 248	56, 921	45, 098
Farms reporting avocados	823	863	1, 500	1, 773
Trees of all ages	181, 927	131, 341	377, 455	448, 523
Trees of bearing age	130, 376	86, 195	213, 665	413, 199
Trees not of bearing age	51, 551	45, 146	163, 790	35, 324
Tons harvested	229	1, 892	2, 278	10, 189
Dade County				
Total number of farms	1, 160	1, 439	1, 301	1, 151
Farms reporting avocados	324	331	487	531
Trees of all ages	148, 003	101, 293	342, 465	433, 191
Trees of bearing age	113, 727	78, 298	198, 175	401, 479
Trees not of bearing age	34, 276	22, 995	144, 290	31, 712
Tons harvested	138	1, 618	2, 046	10, 070
Percentage of Florida's production	60. 3	85. 5	89. 8	98. 8

future production of Florida avocados is the rate at which bearing trees are being replaced.

Avocado trees come into commercial production during their fourth year and reach peak production sometime after their eighth year. Therefore, trees planted since 1950 will influence crop prospects during the 1960's. While it is recognized that census data do not permit a complete analysis, they do provide a basis for estimating.

The estimated rate of planting in Florida, for each of four census periods and for all four periods combined, is shown in table 4. These estimates were derived from data shown in appendix table 2.

The highest rate of planting in the State was reported during the 1950 census when there were 77 nonbearing trees for each 100 bearing trees. By 1959, however, the rate of planting had declined to nine. In Dade County, planting rates were 73 per 100 bearing trees in 1950 compared to 8 in 1959.

Assuming that an avocado tree comes into commercial production in 5 years and has a life span of 35 years, at least 15 new trees would have to be planted per year to maintain 100 bearing trees. In view of these figures, it is concluded that bearing groves in Dade County were not maintained in the 1950's.

The data also suggest that bearing groves were more than maintained in all other Florida counties. However, the tree mortality rate in these areas has apparently been so high that even with extremely favorable planting rates the number of bearing trees has gone down since 1930. And, since production is concentrated in Dade County, any changes outside this district may be relatively unimportant.

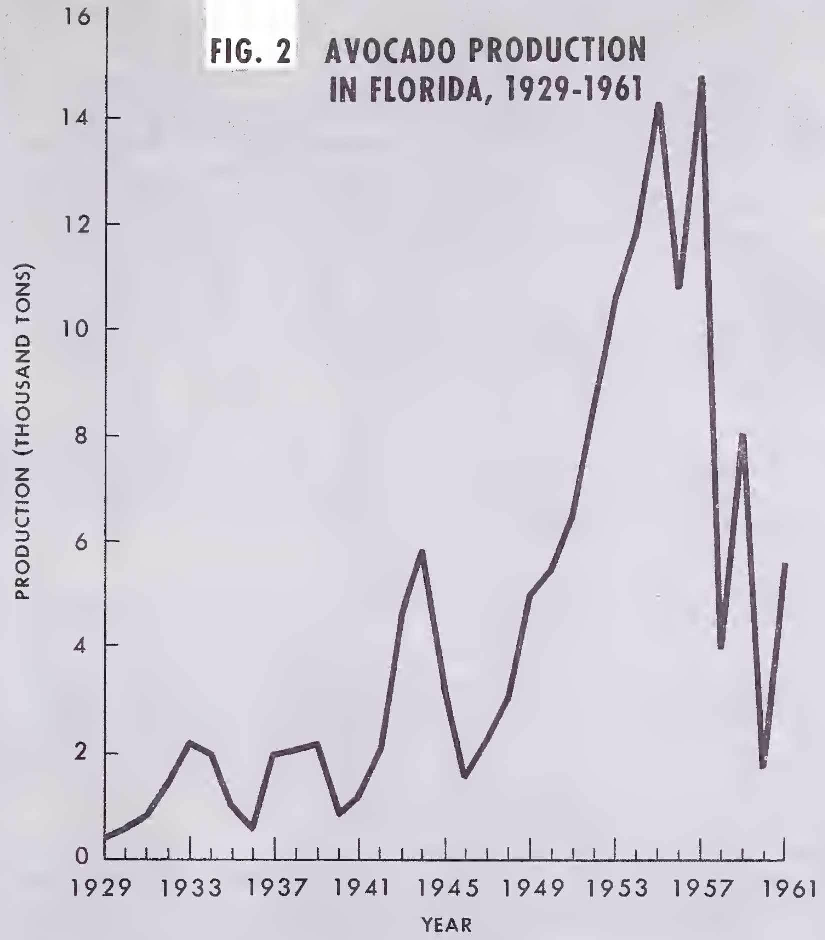
Trend Over Three Decades.--While production of Florida avocados trended upward and displayed compound changes from season to season, no clear-cut trend is apparent from 1929 to the early 1960's (figure 2). This is attributed in large part to a series of freezes in December 1957 and the spring of 1958.

In addition to weather conditions, changes in production from year to year are associated with such factors as size of crop the previous year, diseases, and insects. In 13 individual years, the change in production from the previous year was 50 percent or more. In only 9 years was the change less than 25 percent.

An upward trend in production over the period reflects the increasing number of bearing trees on production units that became

Table 4. --Number of avocado trees not of bearing age for each 100 bearing trees in Florida, by selected census periods

Census period	Planting rate per 100 bearing avocado trees		
	All counties	Dade County	Other counties
1930	40	30	104
1940	52	29	280
1950	77	73	126
1959	9	8	31
Average	35	29	121



more commercialized. A greater proportion of Florida farms are now producing avocados than formerly, and the bulk of the crop is represented by a comparatively small number of growers in Dade County.

California Production.--Although the first known avocado plantings in California were made in Azusa, near Los Angeles, in 1858, it was not until the World War I era that the industry began to develop into a commercial enterprise. In 1929, its output of 400 tons represented 49 percent of the domestically produced crop. Production steadily increased to an alltime high of 70,000 tons in 1959.

In 1959, 22 of California's 58 counties reported avocado production (appendix table 3). Of the total quantity harvested, 98 percent was accounted for by five counties--San Diego, 67.1 percent; Ventura, 11.5 percent; Orange, 8.3 percent; Santa Barbara, 6.5 percent; and Los Angeles, 4.6 percent. The remaining 17 counties accounted for 2.0 percent of the total.

Thus, the commercial avocado districts in this State are primarily confined to the subtropical climatic zones which characterize southern California.

Trend Toward Concentration and Specialization.--Developments in the California avocado industry also reveal the trend toward commercialization, concentration of production, and larger individual producing units.

In 1930, only 2,566 of 135,676 California farms--one out of 53--reported production of this fruit (table 5). These farms produced an average of 530 pounds of avocados on 51 bearing trees. By 1959, the proportion of California farms growing avocados had increased to one out of 16. They produced, on the average, nearly 15,000 pounds of fruit on 259 trees. Between these two periods, the total number of trees per farm increased from 190 to 324.

These shifts became more pronounced when data for San Diego County were compared with State figures. In 1930, 22 percent of the total number of farms in this area accounted for 23 percent of the State's production. These farms, on the average, harvested 360 pounds of fruit from 53 trees. In 1959, 6 out of every 10 farms in this county accounted for 67 percent of California's production. At the same time, the size of grove per farm increased from 305 to 371.

Ratio of Nonbearing to Bearing Trees.--The estimated ratio of plantings per 100 bearing trees in California during four census periods and for all periods combined is

Table 5. --Commercial avocado production in California, by selected census periods

Production area and item	Commercial avocado production in California, census of--			
	1930	1940	1950	1959
California				
Total number of farms	135, 676	132, 658	137, 168	99, 260
Farms reporting avocados	2, 566	4, 842	6, 028	6, 255
Total acreage	6, 069	(1)	17, 878	24, 200
Trees of all ages	487, 920	862, 059	1, 445, 103	2, 025, 850
Trees of bearing age	131, 413	663, 917	781, 745	1, 620, 212
Trees not of bearing age	356, 507	198, 142	663, 358	405, 638
Tons harvested	[2] 680	11, 973	10, 509	46, 551
San Diego County				
Total number of farms	3, 902	5, 814	6, 696	4, 924
Farms reporting avocados	860	1, 973	2, 666	2, 925
Total acreage	(1)	(1)	10, 960	14, 056
Trees of all ages	262, 585	495, 861	836, 568	1, 085, 570
Trees of bearing age	45, 823	380, 643	469, 622	933, 281
Trees not of bearing age	216, 762	115, 218	366, 946	152, 289
Tons harvested	[3] 155	8, 005	6, 742	31, 246
Percent of total production	22. 8	66. 9	64. 2	67. 1

[1] Data not available.
[2] 104, 557 boxes at 13 pounds per box.
[3] 23, 882 boxes at 13 pounds per box.

Table 6.--Number of avocado trees not of bearing age for each 100 bearing trees in California, by selected census periods

Census period	Rate of planting for each 100 bearing avocado trees		
	All counties	San Diego County	Other counties
1930	271	474	163
1940	30	30	29
1950	85	78	95
1959	25	16	37
Average	51	47	56

shown in table 6. These proportions were derived from the data shown in appendix table 4.

The highest rate of planting in the State was reported during the 1930 census, when there were 271 nonbearing trees for each 100 bearing. By 1959 the rate of planting had declined to 25. In San Diego County, planting rates were 474 per 100 bearing trees in 1930 compared to 16 in 1959.

These data suggest that new tree plantings in California have been more than the number required to maintain bearing groves. And, in view of the ratios prevailing in 1959 and in previous periods, bearing acreage in California should increase over the next 10 years.

Rate of Change Over Three Decades.--Production of avocados in California, as in Florida, has displayed marked fluctuations and an upward trend over the years. From 1929 through 1961, supplies increased at an average rate of 10.7 percent a year. The relationship between annual production and trend over the period is shown in figure 3.[3]

Irregularity in production from season to season is primarily due to the alternate bearing habit of the avocado tree and to variations in weather conditions. During 24 of the 33 crop seasons, production alternated; and in 9 seasons, the stride of alternation changed.

Changes over the period reflect the specialized nature of production and corresponding increase in average yields per acre. For example, during the period from 1929 to 1933, the average annual yield per acre amounted to 2,000 pounds compared with 2,534 pounds from 1939 to 1943, and 4,192 pounds from 1956 to 1961 (appendix table 5). The highest State average yield of 6,600 pounds was reached during the 1959-60 season.

Over the entire 33-year period, average yield per acre increased at an annual rate of 4.1 percent a year (figure 4).[4]

Comparison of Trends Between Florida and California.--Even though avocado production has trended upward in both Florida and California, an important change has occurred in their relative positions as a source of supply. In 1929, each State accounted for about one-half

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[3] The constants a and b for the function $y = ab^X$ were fitted by the method of least squares. The resulting equation of this growth was $y = 2.28303\ (1.10727)^X$.

[4] The constants a and b for the function $y = a + bx$ were fitted by the method of least squares. The resulting equation of this growth was $y = 1.38180 + (.05648)x$.

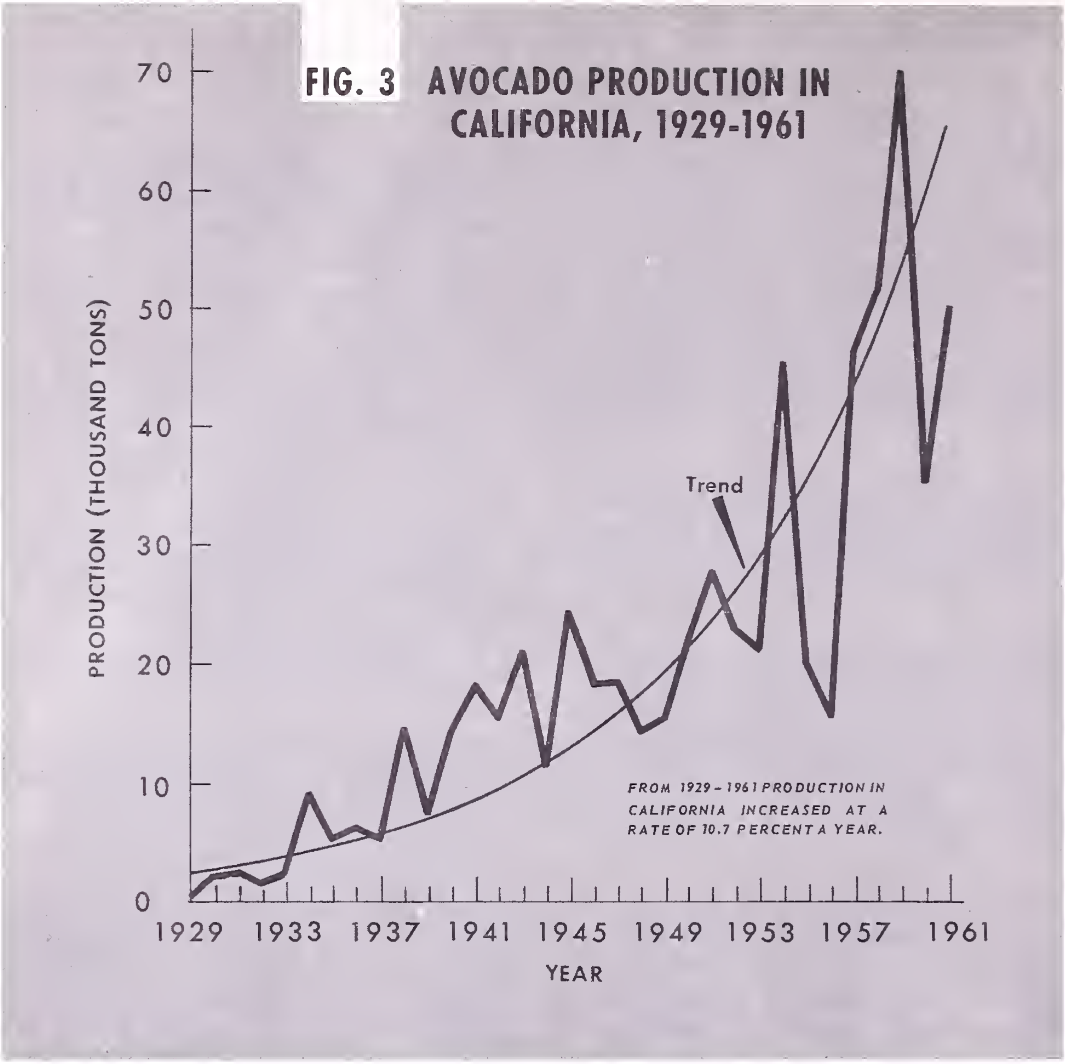

FIG. 3 AVOCADO PRODUCTION IN CALIFORNIA, 1929-1961

FROM 1929 - 1961 PRODUCTION IN CALIFORNIA INCREASED AT A RATE OF 10.7 PERCENT A YEAR.

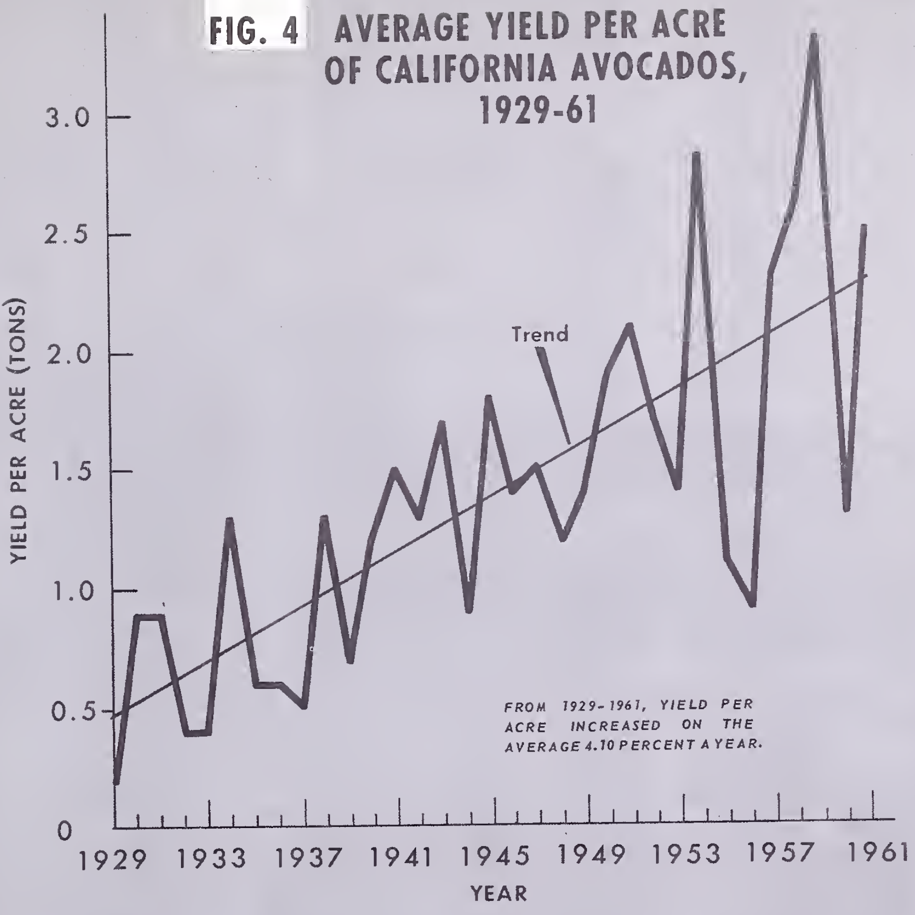

FIG. 4 AVERAGE YIELD PER ACRE OF CALIFORNIA AVOCADOS, 1929-61

FROM 1929-1961, YIELD PER ACRE INCREASED ON THE AVERAGE 4.10 PERCENT A YEAR.

the total domestic crop. During the following 32 years, Florida's position trended downward, and in 1961 less than 10 percent of the crop originated in this State. The significant features of this change are shown in figure 5.

When analyzed by individual years, Florida represented 20 percent or more of the total in 16 of 33 seasons. The range was from a high of 51 percent in 1929 to a low of 5 percent in 1960. Conversely, California accounted for more than 80 percent of the total during 17 seasons. The range was from a low of 49 percent in 1929 to a high of 95 percent during 1960.

Florida Declining Productionwise.--Since a comparison of the production data suggested a change in favor of California over the period, a trend analysis based upon the annual tonnage differential of California over Florida was computed. Results of the computations are

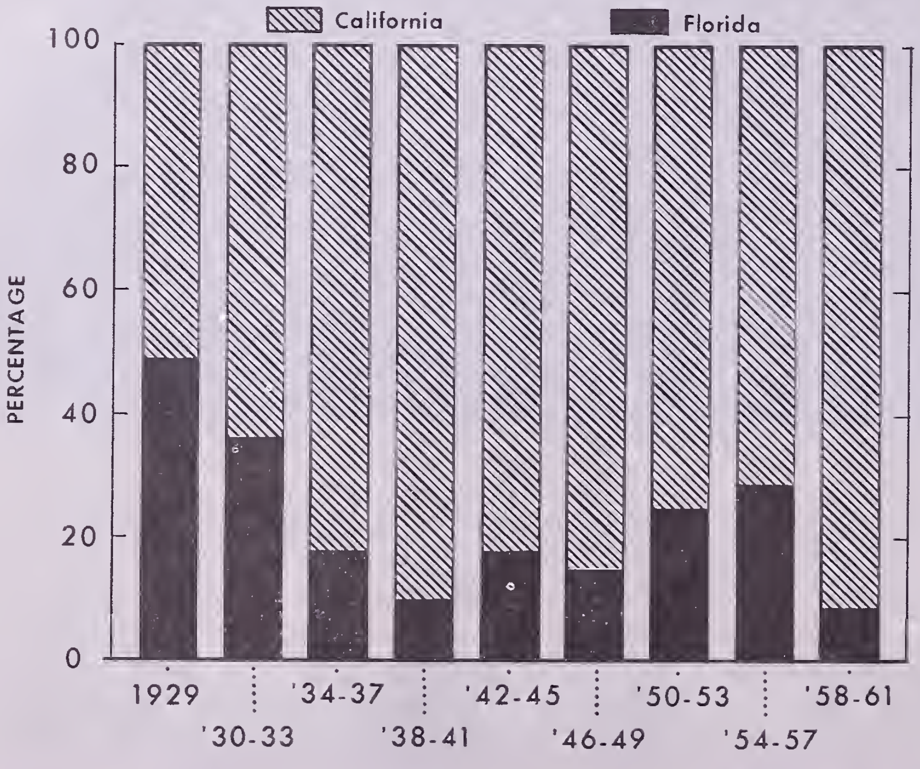

FIG. 5 PERCENTAGE OF DOMESTIC COMMERCIAL CROP OF AVOCADOS PRODUCED BY FLORIDA AND CALIFORNIA, BY PERIODS, 1929-61

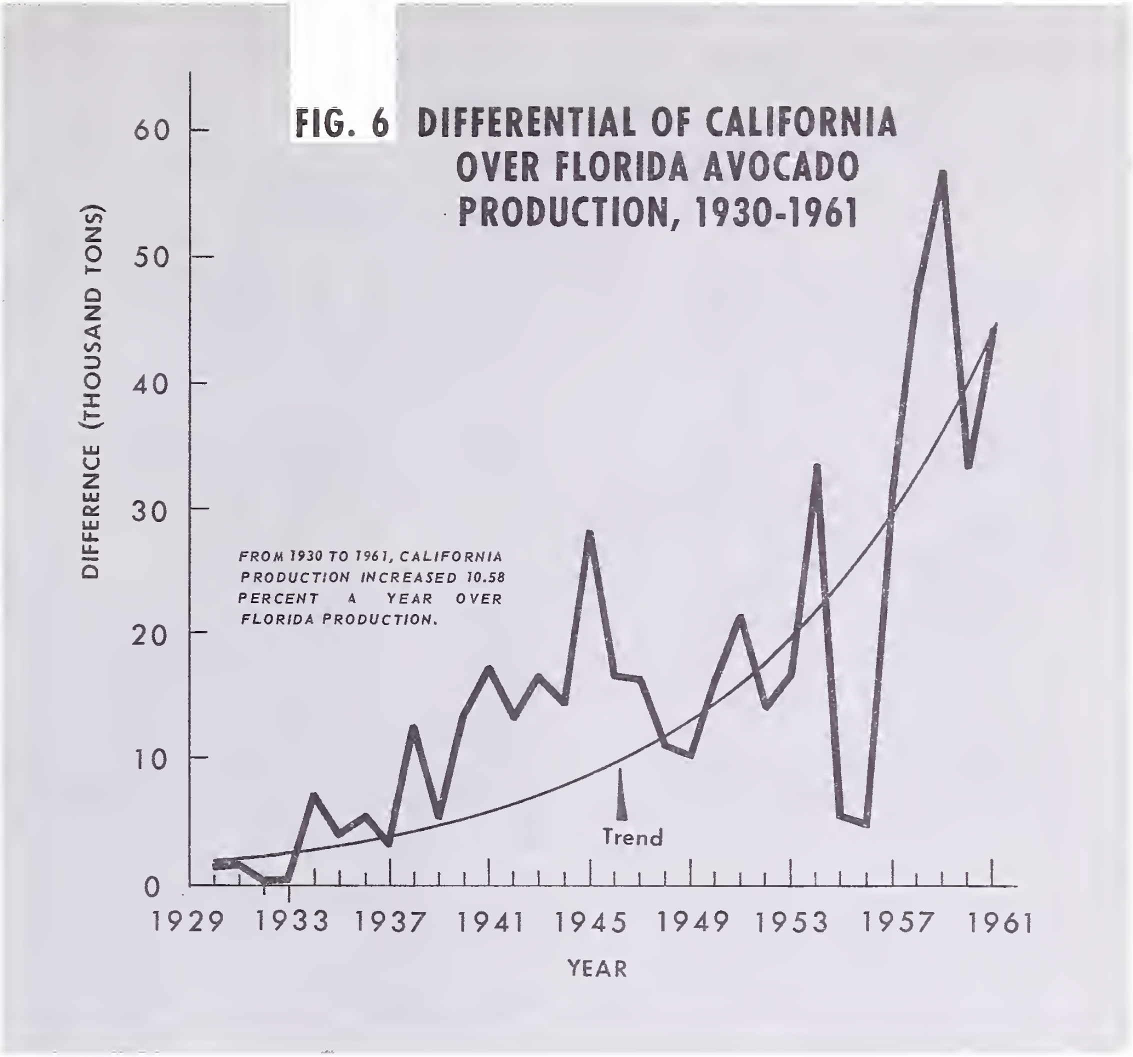

FIG. 6 DIFFERENTIAL OF CALIFORNIA OVER FLORIDA AVOCADO PRODUCTION, 1930-1961

pictured in figure 6, where the annual tonnage difference in thousand tons and the shift toward California are shown.

According to the analysis, from 1930 to 1961 California production increased at a rate of 10.6 percent a year over Florida's production.[5]

Two important factors contributing to California's increasing production role have been (1) a comparatively greater increase in the number of commercial avocado farms and (2) a comparatively greater increase in the number of trees of bearing age.

Florida's Industry not as Specialized as California's.--To provide some measure of the comparative growth of the avocado industry in each State, data in previous tables have been summarized in table 7.

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[5] The constants a and b for the function $y = ab^x$ were fitted by the method of least squares. The resulting equation of this difference in growth was $y = 1.79202 (1.10575)^x$.

Table 7. --Trends in specialization and concentration of avocado production, by census periods

Production area and item	Percentage change between--			Average net change
	1930 and 1940	1940 and 1950	1950 and 1959	
Florida				
Total number of farms	5.6	-8.6	-20.8	-7.9
Farms reporting avocados	4.9	73.8	18.2	32.3
Number of trees of bearing age	-33.9	147.9	93.4	69.1
California				
Total number of farms	-2.2	3.4	-27.6	-8.8
Farms reporting avocados	88.7	24.5	3.8	39.0
Number of trees of bearing age	405.2	17.7	107.3	176.7
Florida and California				
Total number of farms	0.1	-0.4	-25.6	-8.6
Farms reporting avocados	68.3	32.0	6.6	35.6
Number of trees of bearing age	186.5	32.7	104.3	107.8

If no differences had existed in the degree of specialization, the number of farms growing avocados in Florida and California would have increased an average of 36 percent and the number of trees of bearing age 108 percent over the period (column 5, the last 2 rows). However, this was not the case. Increases in California were above these averages, while changes in Florida were below.

In Florida, the number of farms reporting avocados increased 32 percent and the number of trees of bearing age, 69 percent. On the other hand, the number of farms reporting avocados in California increased 39 percent, and the number of trees of bearing age increased 177 percent. In both States the total number of farms declined about 8 percent.

A comparison of changes between individual census periods for Florida revealed the greatest degree of specialization occuring from 1940 to 1950. In California, specialization and concentration developed most rapidly between 1930 and 1940.

Implications to the Florida Industry.--These developments are important to the Florida avocado industry for several reasons. First, they indicate that the small producer is going out of production. Fewer farms are now growing backyard plantings, and the bulk of the crop is being produced by commercial growers having a large number of trees per farm. A continuation of this trend should mean that total avocado supplies in the future may, from time to time, be more than the quantity needed for normal market requirements.

Second, wide variations from year to year in the size of crop emphasizes the need for complete and accurate estimates of production as well as maintaining an up-to-date on-tree inventory as the marketing season progresses. The industry must at all times know what quantities are available for sale if orders are to be filled as specified.

Third, in view of Florida's declining position productionwise, all members of the industry should expect increasing competition from California in maintaining established outlets. If avocado sales are to be increased, they must be prepared to capture a share of the market from well-established producers and packers in that area.

Fourth, although southern Dade County still has thousands of acres of potential avocado land, high land prices and taxes have discouraged planting new acreage in recent years (6). The ratio of bearing to nonbearing trees by census periods reflects this trend. A continuation of this trend means that production in Florida will not increase at as fast a rate in the next decade as it has in the past.

Imports

In addition to domestic production, supplies of avocados moving into domestic trade channels have been supplemented by imports. Until 1960, when Cuban shipments ceased, imports from that country predominated. From time to time, small quantities arrived from Chile, Dominican Republic, Mexico, Haiti, Nicaragua, Panama, Bermuda, and the West Indies (5).

The predominance of Cuban shipments stems from the Reciprocity Treaty of 1902 which permitted that country to ship avocados to the United States duty free. Other countries paid an import duty of 15 cents a pound from 1930 through 1946, and in 1947 the rate was set at 7.5 cents.

Imports, like domestic production, have varied considerably from season to season and over the years. This situation is outlined in figure 7 where annual imports and the trend for the prewar and postwar periods are shown.

According to the analysis, avocado imports increased 2.7 percent a year from 1929 through 1941.[6]

From 1942 through 1945, imports decreased sharply due to wartime shipping restrictions and a damaging hurricane in 1944 that severly curtailed Cuba's production in 1945. In light of the limited number of observations, no attempt was made to fit a trend line to this period.

During the postwar era, imports gradually trended upward at about 1.0 percent a year.[6]

As a source of supply, imports have thus assumed a steadily declining role in relation to domestic production. Further, these quantities have not seriously competed with domestic supplies since their sales were concentrated at a time when domestic marketings were at a seasonal low--June 1 through September 30.

For a more detailed discussion of the intraseasonal pattern of distribution, see page 22. A succeeding section titled "Prices" evaluates the effect of importations on prices received by domestic producers.

Utilization and Consumption

Another factor bearing upon returns to growers and shippers is consumption of the product. This is particularly true for a product such as avocados, where per capita usage is rather low from the viewpoint of industry members. Any increase in the demand for this product should raise the income of growers and shippers alike.

A review of the consumption pattern and associated factors may suggest possible ways of obtaining improved returns.

Consumption Per Capita

Avocados are used mostly in fresh form as a fruit salad or sliced and diced for salad combinations. They also are served whole, on

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[6] The constants a and b for the function $y = a + bx$ were fitted by the method of least squares. The resulting equation of this increase was $y = 4{,}400.8 + 117.1x$ for the period 1929 through 1941 and $y = 3{,}498.8 + 33.7x$ for the postwar period.

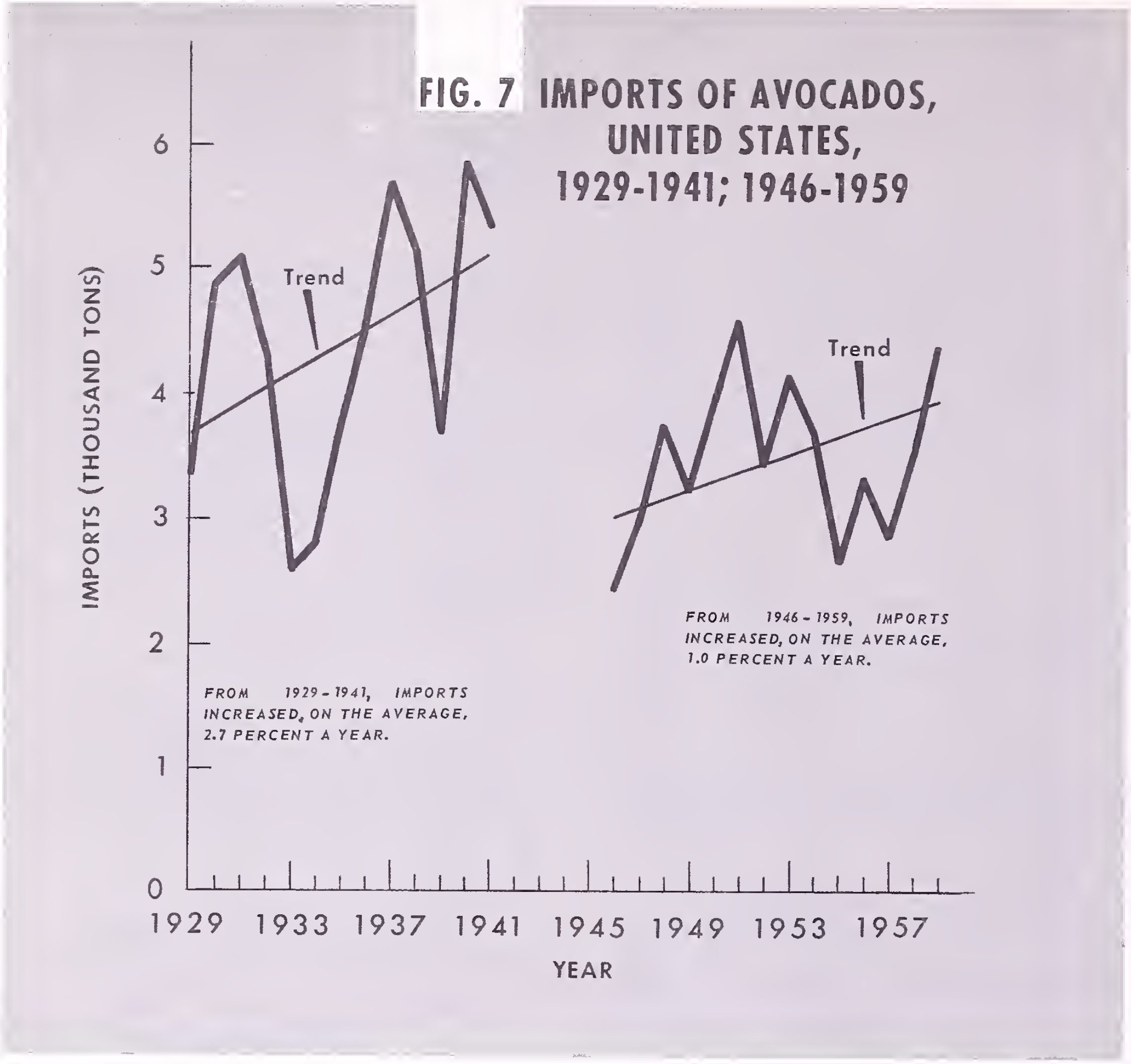

FIG. 7 IMPORTS OF AVOCADOS, UNITED STATES, 1929-1941; 1946-1959

FROM 1929-1941, IMPORTS INCREASED, ON THE AVERAGE, 2.7 PERCENT A YEAR.

FROM 1946-1959, IMPORTS INCREASED, ON THE AVERAGE, 1.0 PERCENT A YEAR.

the half shell, used as a spread on crackers or sandwiches, or served with meat and seafood. While a number of byproduct uses have been explored, including extraction of the oil, canning, and freezing, the processes have either been impractical or unprofitable; and none have been developed on a commercial scale. Fresh sales are thus the major outlet for the avocado crop.

While annual consumption per person has increased at a rate of 6.6 percent a year, the average is still less than 1 pound. Annual usage since the late 1920's and the long-term trend are shown in figure 8.[7]

Background Characteristics of Homemakers

A nationwide survey of consumers conducted in the spring of 1957 provides background information about the important

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[7] The constants a and b for the function $y = ab^x$ were fitted by the method of least squares. The resulting equation of this growth was $y = (.10236)\ (1.06635)^x$.

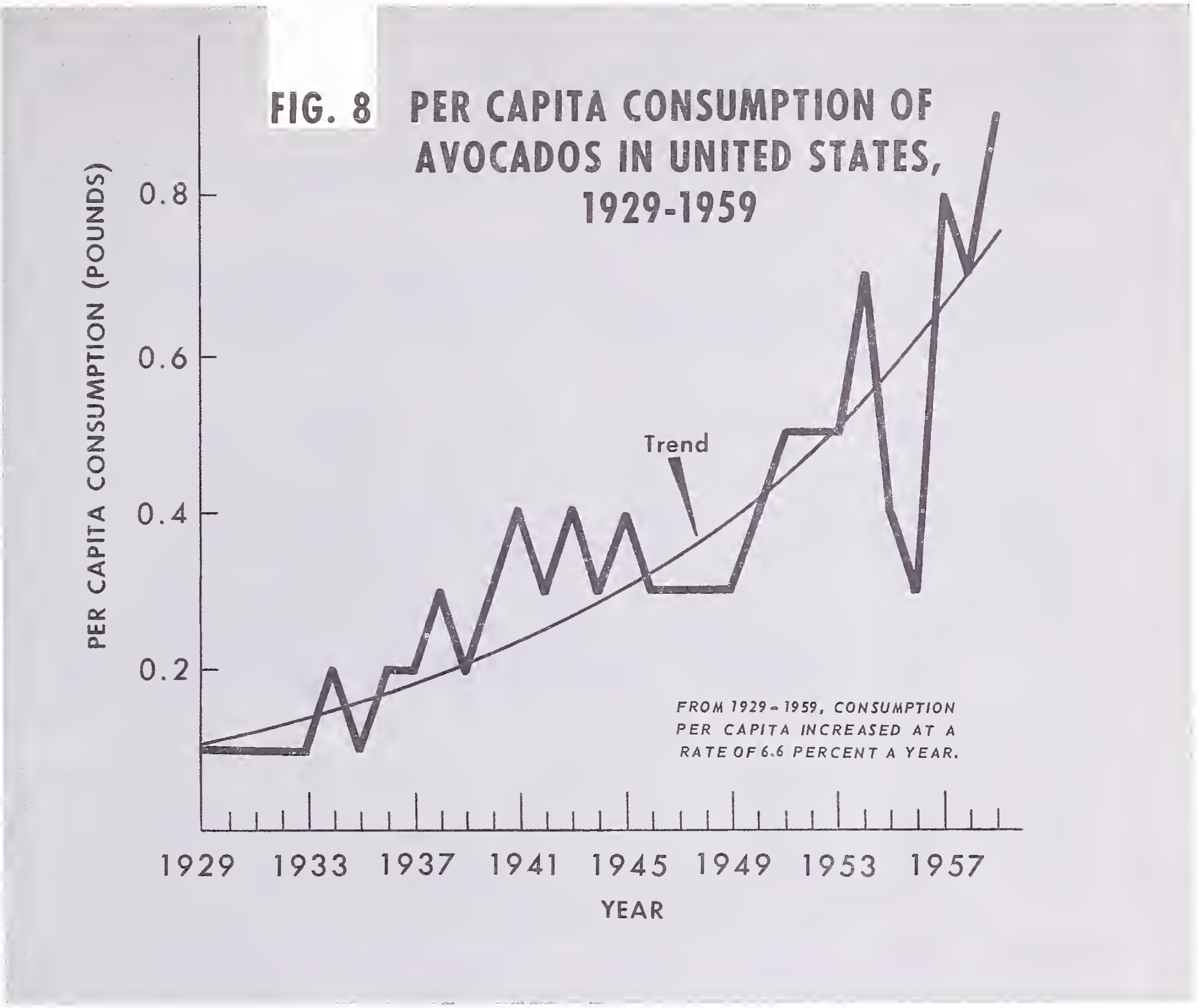


FIG. 8 PER CAPITA CONSUMPTION OF AVOCADOS IN UNITED STATES, 1929-1959

users (1). Table 8 presents relevant findings. Since consumers' habits, attitudes, and preferences change slowly, the findings should fairly well describe the present-day situation.

The responses clearly show that avocados are comparatively unfamiliar in American homes. Only 25 percent of the homemakers interviewed had used avocados the previous year, and 13 percent said that they had never heard of them. The highest percentage of users reported they served this fruit less than once a month.

Widest usage of avocados coincided with nearness to, and importance of, the major commercial production areas, the West and the South. Other background characteristics of principal users included one or more of the following: They (1) lived in large urban areas, (2) had no children, (3) were in the

Table 8. --Use of avocados among households, classified by background characteristics, United States, 1956

Background characteristics of users	Use of avocados in past year				Frequency of serving avocados				
	Used	Did not use	Never heard of	House-holds	More than once a week	Once a week	1 - 3 times a month	Less than once a month	House-holds
	Percent	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Number*
United States total	25	62	13	2,572	10	10	31	49	633
Region									
Northeast	16	68	16	660	12	10	31	47	104
North Central	12	73	15	743	2	2	21	75	91
South	25	58	17	753	12	11	30	47	188
West	60	38	2	416	11	13	35	41	250
Size of community									
Large urban areas	31	61	8	714	15	14	29	42	220
Other urban	26	60	14	988	7	8	34	51	254
Rural	18	64	18	870	8	8	29	56	159
Family composition									
No children	27	60	13	1,187	10	10	32	49	314
Children 12 - 17 only	25	63	12	249	11	13	24	52	63
Children under 12 only	24	65	11	784	12	7	33	48	189
Children both age groups	19	60	21	351	6	6	27	51	67
Family income group									
Upper	35	61	4	792	9	9	34	48	281
Middle	22	66	12	971	12	12	30	46	210
Lower	18	57	25	763	7	10	26	57	133
Education of homemaker									
College	45	53	2	423	9	10	32	49	191
High school	25	66	9	1,368	9	9	31	51	340
Grammar school	13	60	27	769	16	12	29	43	98
Age of homemaker									
Under 35 years	22	66	12	786	12	10	32	46	176
35 - 49 years	27	61	12	859	10	12	27	51	298
50 years and over	23	59	18	913	8	6	37	49	156

upper income group, (4) had a college education, and (5) were between 35 and 49 years of age.

Homemakers' Attitudes Toward Avocados

The survey also highlighted some reasons why homemakers do or do not use avocados. When those who had used avocados in the last year were asked what they liked about this fruit:

63 percent said they liked the taste,
29 percent said they were healthful,
22 percent said they were good in salads,
18 percent said they added variety to a meal.

Other responses were: Gives eye appeal to foods, like texture, easy to serve, improves other foods, satisfying, just like them, and avocados are a "ritzy" food. Some respondents mentioned more than one factor.

About 6 out of 10 users said they liked the taste and mentioned such characteristics as different, distinctive, mild, mellow, rich, nutty-like flavor, and buttery. Health reasons, mentioned by 3 in 10, included: Nourishing, rich in vitamin content, high in protein, rich in oil, and helpful in gaining weight.

When those who had not used avocados in the last year were asked why: 43 percent said they were unfamiliar with the fruit; 24 percent mentioned taste reasons; 20 percent said they didn't like them; and 13 percent said they were too expensive.

Other reasons were: Not available in the store (9 percent); health reasons (5 percent); don't like appearance (3 percent); too mushy (2 percent); greasy or oily (2 percent). These percentages exceed 100 since some homemakers mentioned more than one factor.

About 4 of 10 homemakers said they were unfamiliar with avocados. These replies included: Never tried or used, don't know how to prepare, don't know what they are, and don't know how to buy them. Nonusers in the Northeast and the South mentioned unfamiliarity more frequently than those in the West.

Marketing Factors Considered by Homemakers

Consumers use one or more criteria in selecting avocados, including physical characteristics of the product and time of year.

Here are the leading answers homemakers who used the fruit in the past year gave to the question, "What do you look for when buying avocados?" Some respondents mentioned more than one factor.

Thirty-one percent of the homemakers said they looked for color.

Color preferred	Percent
"Good green"	16
Brown, brownish, somewhat black	6
Not described	4
Not black or dark	4
Not too green	1

Twenty-two percent of the homemakers said they looked for a certain size.

Size preferred	Percent
Large	9
Medium	6
Small	1
"Right size"	6

Twelve percent of the homemakers based their judgment on skin texture.

Skin characteristics	Percent
Smooth	7
Thin	4
Shiny or rough	1

Fifty-nine percent of the homemakers said they used avocados "all year round," 2 percent did not say whether their use was seasonal or year-round, and 39 percent specified seasonal use as follows:

When used	Percent
Summer	16
Winter	7
Spring	7
Fall	6
Holidays	1
Exact season not specified	2

In addition, 26 percent of the homemakers questioned said they looked for firmness, 25 percent looked for "ripeness," 22 percent wanted "fairly soft" or "not too hard" fruit, and 14 percent looked for fruit without bruises or blemishes.

Although three of four homemakers who used avocados in the last year said the product met their specifications, a marked difference existed in their response on availability. Two-thirds of the seasonal users in the South and three-fourths in the North said that stores did not carry avocados the year round. These compared with one-half of the users in the West.

Implications to the Florida Industry

The fact that such a small percentage of homemakers actually used avocados--particularly in areas most accessible to Florida supplies--and that about one in eight had never heard of them, implies that advertising and sales promotion should be considered vital to a marketing program.

Experience of other agricultural industries brings out several factors that contribute to effective market development. These include adoption of and adherence to uniform grades and standards, uniform sizing of produce within individual containers, use of identifying brands, proper loading, and efficient transportation. Their advertising embraces newspapers, magazines, radio, and television as media for drawing consumers' and potential users' attention to the qualities and uses of the product.

Dealer-service work in the important markets has proven particularly effective where retailers are indifferent to, or lack knowledge of, the merchandising merits of the product.

These conditions clearly emphasize that advertising and promotion are only tools. Their success depends upon the willingness of growers and shippers to support the sales expansion program financially, the quality of leadership, and the ability to back up the program with a product of proper grade, size, maturity, and appearance.

Consumers must not only be made aware of the versatility of avocados, they must also be assured that repeat purchases can be made and that such purchases will result in equal satisfaction.

Distribution of Sales

Although avocados are available in the United States each month of the year, competition within and among the major sources of supply has not been as severe as might be expected from the production and import statistics alone.

The following three sections describe the allocation of sales among shippers in Florida and California and the intraseasonal and market distribution patterns for each source of supply. They then evaluate the implications to growers and shippers in Florida.

Among Handlers

Calavo Growers, a cooperative marketing association with headquarters at Los Angeles, is the largest avocado marketing organization in the United States. Since its inception in 1924, when it marketed 80 percent of California's reported production, membership grew from 100 to 2,719 as of September 30, 1961.

During the 10 seasons, 1949-50 through 1958-59, Calavo marketed an average of 58 percent of the California crop, with the percentage 60 or above in six of these years (7).

In addition to handling members' fruit, Calavo has also marketed Florida and Cuba avocados on a consignment basis. Both arrangements were discontinued in 1958, but marketing Florida avocados (except in California) was resumed on a limited basis in 1960.

During recent years, Calavo marketed an average of 49 percent of all avocados moving into domestic trade channels. The range was from a low of 39 percent in 1958-59 to a high of 56 percent in 1951-52.

Besides Calavo, there were 45 other California handlers in 1959. One of these, United Avocado Growers with headquarters at La Habra, was also a cooperative. Twelve of these handled about 43 percent of all sales while the remaining 33 accounted for some 12 percent.

Marketing at the shipping point level in Florida is less coordinated than in California. In Florida, marketing involves (1) decentralization of sales among independent dealers, and (2) no one shipper handling a bulk of the crop.

In 1961, 39 shippers were registered with the Florida Department of Agriculture. Of these, five handled approximately 90 percent of the Florida avocado crop. No one of these marketing agencies handled more than 33 percent of Florida's avocado sales. The remaining 10 percent of the crop was marketed by 34 shippers.

Within the Marketing Season

Marketing in Florida normally begins in June and ends in March. During the past decade, about three-fourths of the avocado crop moved to market in the months of September, October, November, and December with shipments reaching a peak in November (table 9).

Avocados are harvested every month in California with sales generally heaviest from January through May and tapering off to a low in October. Sales usually reach their peak

Table 9. --Estimated distribution of avocado sales in the United States, classified by origin of supplies and month, 1949-59 [1]

Origin	Percentage of total volume of avocados, sold during--												Total
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Florida	12.7	6.7	.4	--	--	--	1.9	5.3	12.8	16.7	24.5	19.0	100
California	8.3	12.7	14.8	14.3	13.6	7.7	6.1	4.1	4.1	3.4	3.9	7.0	100
Cuba	--	--	--	--	--	7.6	40.4	35.7	15.7	.6	--	--	100

[1] Derived from data in Orderly Marketing For California Avocados, by Stephen H. Sosnick, July 1961, California Agricultural Experiment Station, 89 pp.

the latter part of March or in April when harvesting of Fuerte is heaviest.

Supplies from Cuba predominated in the summer months with July and August representing 76 percent of the importations. The predominance of imports during these months stemmed from a 1934 trade agreement with Cuba which specified that shipments to the United States must clear a Cuban port between these dates (7).

Thus, the intraseasonal distribution pattern for each major source of supply has been rather pronounced with the bulk of Florida sales moving to market in the fall, California marketings in the winter and spring, and imports during the summer.

By Markets Served

In addition to having different monthly sales patterns, there has been little competition among the three production areas in terms of the time of the year during which avocados moved into the major markets. The volume of carlot unloads in each important receiving market has fairly well reflected the seasonal marketing pattern of its nearest source of supply. Since marketing patterns are more or less distinct and at different times within the season, movements into even the same markets have been concentrated in different months (table 10).

For example, 94 percent of all unloads received by New York City during the period October through December originated in Florida. In Chicago, the percentage was 86; and in New Orleans, 97. On the other hand, 100 percent of all unloads in the Los Angeles market during the period April through September originated in California.

From 1950 through 1961, the bulk of unloads in major markets east of the Mississippi River and in the South have thus followed the sales pattern of Florida, or Cuba and Florida where both were represented, reaching a peak in the summer and fall and tapering off in the winter and spring. In the major Pacific Coast markets, unloads were highest during the winter and spring and lowest in the summer and fall, reflecting California's marketing pattern.

The heaviest shipments of Florida avocados into Pacific Coast and intermountain States occurred during the off-season for California fruit. Likewise shipments by California into eastern and southern markets were concentrated during the off-season for Florida and Cuba supplies.

While the geographic distribution of total Florida avocado unloads in major markets east of the Mississippi River and in the South has varied from year to year, figures for the period 1958-61 were: New York City, 20 percent; Chicago, 7 percent; and New Orleans, 6 percent. For California, they were: Los Angeles, 39 percent; and Oakland plus San Francisco, 12 percent.

Annual unload data for individual receiving markets, classified by origin of supply, are shown in appendix tables 6 and 7.

Implications to the Florida Industry

Data on the intraseasonal pattern of distribution and annual carlot unloads by months implies that competition among Florida, California, and Cuba has not been as significant as might be expected from viewing production and import statistics. Florida sales were concentrated during the off-season for California and Cuba supplies. In addition, the volume of receipts in each market analyzed fairly well reflected the marketing pattern of its nearest source of supply.

Previous difficulties in marketing Florida fruit may have been due, therefore, to (1) commodities failing to meet marketing requirements, (2) an uncoordinated system of distribution, or (3) a combination of these. Implied by these circumstances is the necessity of

Table 10.--Seasonal carlot unloads of avocados in selected markets, classified by origin of supplies, 1950-61

Receiving market and time period	Carlot unloads of avocados shipped from						Total	
	Florida		California		Cuba			
New York, N. Y.	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Jan. - Mar.	333	55.2	258	42.8	12	2.0	603	100.0
Apr. - June	7	2.1	299	89.0	30	8.9	336	100.0
July - Sept.	478	42.3	105	9.3	[1] 546	48.4	1,129	100.0
Oct. - Dec.	1,061	94.3	52	4.6	12	1.1	1,125	100.0
Total	1,879	58.8	714	22.4	600	18.8	3,193	100.0
Chicago, Ill.								
Jan. - Mar.	120	36.9	205	63.1	--	--	325	100.0
Apr. - June	1	.4	249	99.6	--	--	250	100.0
July - Sept.	155	61.5	97	38.5	--	--	252	100.0
Oct. - Dec.	370	86.4	58	13.6	--	--	428	100.0
Total	646	51.5	609	48.5	--	--	1,255	100.0
New Orleans, La.								
Jan. - Mar.	111	44.0	141	56.0	--	--	252	100.0
Apr. - June	--	--	182	86.3	29	13.7	211	100.0
July - Sept.	102	20.9	27	5.5	360	73.6	489	100.0
Oct. - Dec.	304	97.1	8	2.6	1	.3	313	100.0
Total	517	40.9	358	28.3	390	30.8	1,265	100.0
Los Angeles, Calif.								
Jan. - Mar.	20	0.4	4,708	99.6	--	--	4,728	100.0
Apr. - June	--	--	4,139	100.0	--	--	4,139	100.0
July - Sept.	--	--	2,104	100.0	--	--	2,104	100.0
Oct. - Dec.	54	1.7	3,127	98.3	--	--	3,181	100.0
Total	74	0.5	14,078	99.5	--	--	14,152	100.0
Oakland and San Francisco, Calif.								
Jan. - Mar.	18	1.2	1,455	98.8	--	--	1,473	100.0
Apr. - June	--	--	1,215	100.0	--	--	1,215	100.0
July - Sept.	1	.1	758	99.9	--	--	759	100.0
Oct. - Dec.	143	13.2	937	86.8	--	--	1,080	100.0
Total	162	3.6	4,365	96.4	--	--	4,527	100.0
Denver, Colo.								
Jan. - Mar.	12	6.2	183	93.8	--	--	195	100.0
Apr. - June	--	--	175	100.0	--	--	175	100.0
July - Sept.	15	11.5	116	88.5	--	--	131	100.0
Oct. - Dec.	100	49.3	103	50.7	--	--	203	100.0
Total	127	18.0	577	82.0	--	--	704	100.0

[1] Includes two unloads from Puerto Rico and one from the West Indies.

Source: Agricultural Marketing Service, U. S. Dept. of Agr., Unloads of Fresh Fruits and Vegetables for each city.

evaluating grade and size standards, and providing what is required to satisfy dealers responsible for stocking retail shelves.

These considerations are particularly important when sales are concentrated in such a short period of time. Unless marketings at the grower and shipping point levels are coordinated with buyers demands, alternating periods of gluts and scarcities are likely to occur. This situation, in turn, can lead to price instability and may subject the seller to the risk of losing established outlets.

Producers, shippers, or both, operating independently of each other as in Florida, experience difficulty in obtaining an equitable adjustment of supplies within and among markets. Lack of coordination may have resulted in oversupplying some markets and undersupplying others. It also encourages excessive discounting of prices in large crop years when buyers are in the best bargaining position. Conversely, it encourages the holding out for high prices in short crop years, when shippers' bargaining power is greatest.

As with the pattern of production and consumption, the problems involved in providing a specification product and in obtaining orderly distribution are not day-to-day problems, nor are they the problems of any one individual. Rather, they are industry problems of a long-run nature, which require concerted group action if they are to be coped with successfully.

Prices

Attention will now be focused on analyzing the relationship between some of the factors previously discussed and prices received by industry members. This will provide a basis for approximating what changes in avocado prices might be expected under similar conditions in the next decade.

Separate analyses were made for Florida avocados, California avocados, and for the total crop on an annual calendar-year basis. The analyses were based on the 14-year period, 1947-60. These years were considered to be sufficiently alike to permit their combined inclusion in a single analysis. Further, they were considered to best represent the probable future short-run market supply and demand conditions for this fruit.

The following variables on a per capita basis were evaluated as factors influencing avocado prices: (1) Production, (2) disposable personal consumer income, and (3) imports. The combined and individual influence of these factors on annual returns per ton for bulk fruit at the first delivery point were estimated, and changes in price associated with year-to-year changes in each factor were measured.

Results from the analyses point out the possibilities of obtaining increased returns from the sale of avocados in both Florida and California. They also supplement pricing work undertaken by the University of California which has as its objective the developing of a procedure for allocating California production over a season in a manner optimal to the growers and handlers concerned.

For students of avocado marketing, figures used in the text and supporting information for each analyses can be found in footnotes to the corresponding table. For the general reader results of each analyses are expressed in verbal terms.

All Avocados

Table 11 shows the statistical series used, together with actual and estimated prices for all avocados moving into domestic trade channels. The corresponding equation and statistical coefficients relating to the analysis are shown in the footnotes to the table.

Table 11.--Avocados, total crop: Actual and estimated average price received by farmers, and related factors, 1947-60

Year	X_1 Season average price per pound			X_2 Avocado production per capita	X_3 Disposable income per capita [3]	X_4 Avocado imports per capita
	Actual [1]	Estimated [2]	Difference between actual and estimated			
	Cents	*Cents*	*Cents*	*Pounds*	*Dollars*	*Pounds*
1947	18.9	--	--	0.293	1,237	0.042
1948	18.1	19.5	1.4	.241	1,256	.052
1949	18.7	17.1	1.6	.278	1,249	.043
1950	15.1	13.7	1.4	.372	1,332	.053
1951	12.0	11.8	.2	.457	1,327	.061
1952	14.3	14.3	0	.416	1,339	.045
1953	14.1	13.3	.8	.409	1,383	.053
1954	9.5	9.5	0	.712	1,378	.047
1955	14.6	16.3	1.7	.423	1,450	.033
1956	16.0	16.3	.3	.322	1,499	.040
1957	8.7	9.0	.3	.726	1,501	.034
1958	8.3	8.4	.1	.649	1,479	.041
1959	5.5	5.9	.4	.894	1,529	.050
1960	14.2	13.2	1.0	.325	1,568	.036

[1] Compiled from annual reports, U. S. Dept. of Agr.

[2] Estimated using the following equation when all variables are expressed as first difference of logarithms and figures in parentheses are standard errors of estimates:

$$X_1 = -.0125 - \underset{(.0515)}{.7533X_2} + \underset{(.9768)}{.4025X_3} - \underset{(.1002)}{.4364X_4}$$

The following statistical coefficients relate to this analysis:

$$R^2_{1.234} = .9730; \quad S_{1.234} = .0331$$

[3] Disposable income deflated by Consumer Price Index.

Annual prices for all avocados sold in the United States during the post-World War II period were found to be significantly influenced by production per capita and imports per capita. A statistically significant relationship did not exist between year-to-year changes in consumers' personal disposable income and price per ton to growers.

In verbal terms, a 10-percent change in the production per capita of avocados was associated with an average change in the opposite direction of 7.5 percent in returns per ton for bulk fruit at the first delivery point. Since the variation in production was greater than in prices, larger crops generally yielded greater total returns than small crops.

A 10-percent change from the previous year in consumers' personal disposable income was associated with a change in the same direction of 4 percent in the seasonal average price per ton of domestically produced avocados. However, associated with this 4 percent is a standard error of 9.8 percent. After allowing for this error, a 10 percent change in consumers' income was associated with a change of -5.8 to 13.8 percent in price. The probability of this being a true statement is two-thirds.

A 10 percent change in importations per capita was associated, on the average, with a change in the opposite direction of 4.4 percent in the price per ton of domestically produced avocados.

In total, the three variables--per capita production, imports, and disposable income--accounted for 97 percent of the year-to-year variability in price. Changes in domestic production per capita accounted for the largest proportion.

Florida Avocados.-- The statistical series used in analyzing the relationship between changes in price per ton for Florida avocados and the three variables, together with the actual and estimated price, are shown in table 12.

Table 12. --Florida avocados: Actual and estimated average price received by farmers, and related factors, 1947-60

Year	X_1 Season average price per pound			X_2 Avocado production per capita	X_3 Disposable income per capita[3]	X_4 Avocado imports per capita
	Actual[1]	Estimated [2]	Difference between actual and estimated			
	Cents	*Cents*	*Cents*	*Pounds*	*Dollars*	*Pounds*
1947	10.0	--	--	0.032	1,237	0.042
1948	9.0	8.0	1.0	.043	1,256	.052
1949	7.5	7.9	.4	.068	1,249	.043
1950	6.7	6.8	.1	.073	1,332	.053
1951	5.3	5.7	.4	.086	1,327	.061
1952	6.1	5.3	.8	.113	1,339	.045
1953	5.4	5.2	.2	.136	1,383	.053
1954	5.7	5.3	.4	.148	1,378	.047
1955	5.6	6.2	.6	.176	1,450	.033
1956	6.2	5.7	.5	.131	1,499	.040
1957	5.3	5.7	.4	.176	1,501	.034
1958	6.9	7.5	.6	.048	1,479	.041
1959	4.4	4.9	.5	.092	1,529	.050
1960	8.8	8.6	.2	.021	1,568	.036

[1] Compiled from annual reports, U. S. Dept. of Agr.

[2] Estimated using the following equation when all variables are expressed as first difference of logarithms and figures in parentheses are standard errors of estimate:

$$X_1 = -.0181 - \underset{(.0469)}{.3712}X_2 + \underset{(1.2560)}{.7874}X_3 - \underset{(.1288)}{.4303}X_4$$

The following statistical coefficients relate to this analysis:

$$R^2_{1.234} = .8974; \quad S_{1.234} = .0447$$

[3] Disposable income deflated by Consumer Price Index.

Annual prices for Florida avocados during the post-World War II period were found to be highly correlated with changes in production and changes in imports. Personal disposable income of consumers exerted a positive but very questionable effect upon price.

The upper section of figure 9 shows the net relationship between price and per capita production after allowing for changes in the level of income and imports. From 1947-60, a 10 percent change in production per capita was associated with a change in the opposite direction of 3.7 percent in the seasonal average price per ton received by growers of Florida avocados. The comparatively larger percentage change in price suggests that gross money returns to the industry varied in direct proportion to the size of crop.

The middle section of figure 9 shows the net relationship between price and consumer income after allowing for changes in the level of production and imports. On the average, a 10 percent change in personal disposable income per capita was associated with a change in price that varied from -4.7 to 20.4 percent. The probability of this being a true statement is two-thirds. Thus, no positive conclusion can be made on the relationsip between consumption of Florida avocados and consumer income.

The bottom section of figure 9 shows the net relationship between price and imports after the level of production and income are taken into account. On the average, a 10 percent change in importations per capita was associated with a change in the opposite direction of 4.3 percent in the seasonal price per ton received by Florida producers.

The three independent variables accounted for 90 percent of the year-to-year variability in prices. Changes in production per capita accounted for the largest proportion and changes in income the smallest percentage of the price variation.

California Avocados.--As in the previous two analyses, the calendar years 1947 through 1960 were used, and all variables were converted to logarithms and expressed as first differences. The three variables, production per capita, personal disposable income per capita, and imports per capita accounted for 98 percent of the variation in the price of California avocados during this period. Table 13 shows the series used, together with actual and estimated prices.

On the average, a 10 percent change in production per capita of California avocados was associated with a change in the opposite direction of 7.8 percent in the average farm price per ton. The relatively larger percentage change in price suggests that total money returns to growers varied in direct proportion to crop size.

A 10 percent change in disposable income per capita was, on the average, associated with a -10.3 to 12.8 percent change in price per ton. Since the probability of this being a true statement is two-thirds, the relationship between price and income is questionable.

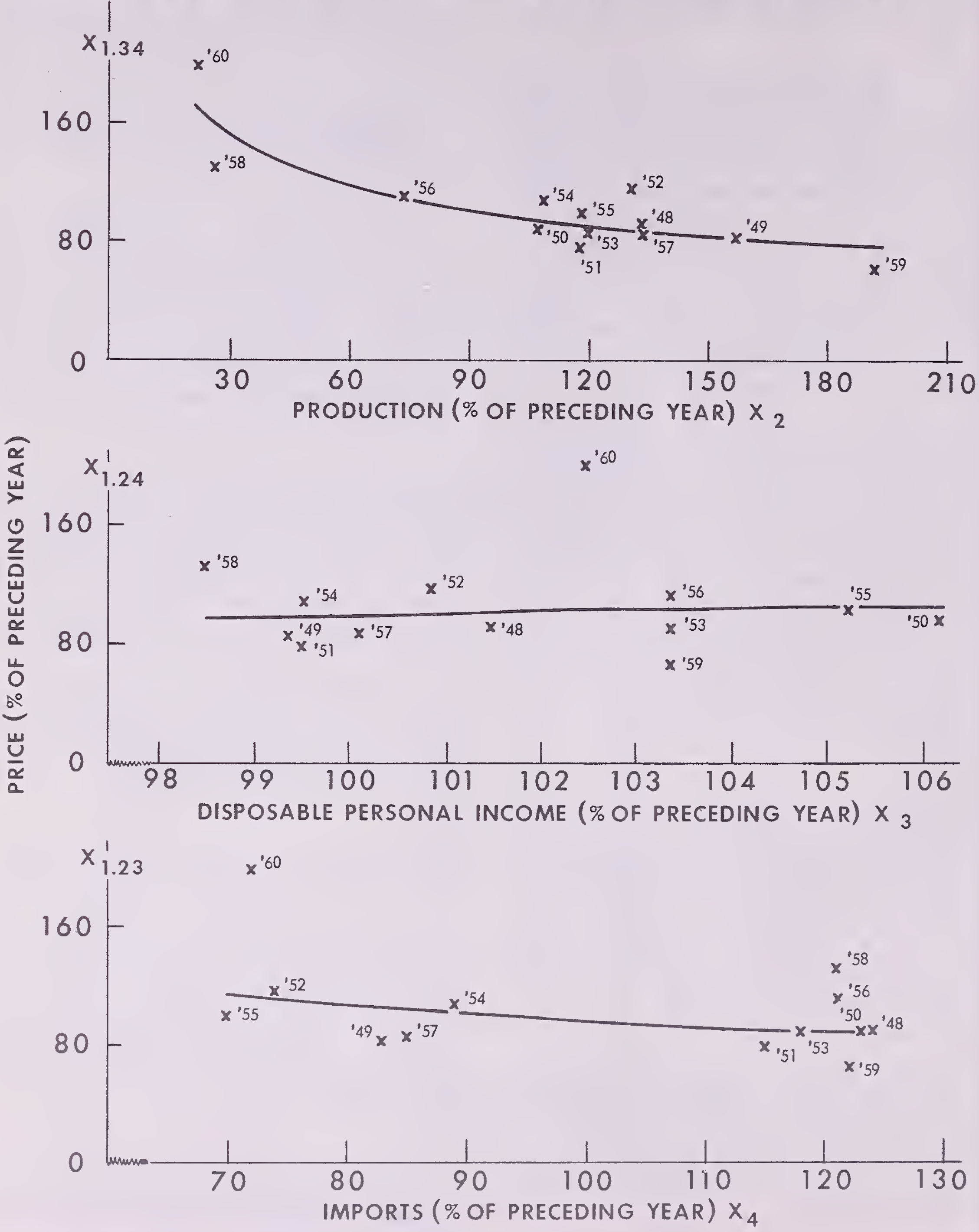
A 10 percent change in importations per capita was associated with an average change in the opposite direction of 4.3 percent in price per ton of California avocados.

Implications to the Florida Industry

The analytical results imply that the Florida avocado industry should primarily concentrate upon ways of improving the demand for, rather than decreasing the supply of, this fruit. The relationship between size of crop and farm price has been such in the immediate past that gross returns to producers have generally varied in proportion to crop size.

Data in appendix table 8 bears this out. In 8 of the 13 years (1948 through 1960), an increase in production from the previous year

FIG. 9 FLORIDA AVOCADOS: PRICES RECEIVED BY FARMERS IN RELATION TO SPECIFIED FACTORS, 1947-1960



was reflected in increased gross returns to the industry. In 3 years, a decrease in supplies resulted in smaller total returns. In only 2 years did changes in production and total farm value of the crop move in opposite directions.

This implies that failure to harvest production would be to the disadvantage of the industry provided that price covered the cost of growing, harvesting, and marketing the crop.

In view of these findings, it is concluded that the pricing problem of the Florida avocado industry is not likely to be solved by the cessation of Cuban imports, adverse weather conditions, or by holding fruit off the market. Rather, consideration should be given to orienting marketing programs and policies toward market development, income maintenance, and income growth.

This would encompass such activities as: (1) Confining advertising and sales promotion to an intensive development of a selected number of eastern and southern markets, (2) serving these markets in light of consumers' preferences, (3) assuring members of the trade that they can purchase according to product specification from each and every shipper, (4) adherence to rigid grading standards from season to season irrespective of the current supply situation, and (5) complete and up-to-date market and production information.

Table 13.--California avocados: Actual and estimated computed average price received by farmers, and related factors, 1947-60

Year	X_1 Season average price per pound			X_2 Avocado production per capita	X_3 Disposable income per capita[3]	X_4 Avocado imports per capita
	Actual[1]	Estimated[2]	Difference between actual and estimated			
	Cents	*Cents*	*Cents*	*Pounds*	*Dollars*	*Pounds*
1947	20.0	--	--	0.261	1,237	0.042
1948	20.0	22.2	2.2	.198	1,256	.052
1949	22.3	20.3	2.0	.210	1,249	.043
1950	17.2	15.3	1.9	.298	1,332	.053
1951	13.5	13.4	.1	.370	1,327	.061
1952	17.4	17.7	.3	.302	1,339	.045
1953	18.5	17.2	1.3	.273	1,383	.053
1954	10.5	10.8	.3	.568	1,378	.047
1955	20.7	23.0	2.3	.246	1,450	.033
1956	22.0	22.8	.8	.191	1,499	.040
1957	9.8	10.2	.4	.550	1,501	.034
1958	8.4	8.2	.2	.601	1,479	.041
1959	5.6	6.1	.5	.803	1,529	.050
1960	14.5	13.3	1.2	.305	1,568	.036

[1] Compiled from annual reports, U. S. Dept. of Agr.

[2] Estimated using the following equation when all variables are expressed as first difference of logarithms and figures in parentheses are standard errors of estimates:

$$X_1 = -.0099 - \underset{(.0516)}{.7781X_2} + \underset{(1.1562)}{.1268X_3} - \underset{(.1160)}{.4289X_4}$$

The following statistical coefficients relate to this analysis:

$$R^2_{1.234} = .9755; \quad S_{1.234} = .0377$$

[3] Disposable income deflated by Consumer Price Index.

INDUSTRYWIDE ATTEMPTS TO IMPROVE MARKETING

With the hope of developing improved marketing conditions, the industry, aided by the Florida Avocado and Lime Council, voted to establish Federal Marketing Agreement No. 121 and Marketing Oder No. 69 in 1954 and, in 1955, established the Florida Avocado and Lime Commission. The Federal program was designed to bring about the marketing of a more uniform product, and the commission was designed to promote its sale.

This section of the report discusses the activities undertaken and evaluates their effectiveness in light of their objectives.

The Florida Avocado and Lime Council

About 10 years ago, increasing production and steadily declining prices stimulated growers' interest in joint activity to the point of establishing the Florida Avocado and Lime Council. This is a voluntary nonprofit association formed to represent its members in all affairs relative to improving the industry, and for the mutual benefit and enlightenment of all members.

Membership is open to all bonafide commercial producers of avocados, limes, or both. Such producers may be individuals, partnerships, or corporations.

The council was relatively inactive until 1954, when it helped obtain approval of a marketing agreement and order program and established the Avocado and Lime Commission.

At one time membership in the council represented approximately 75 percent of the total volume of avocados and limes produced in the State. Currently, the council again is relatively inactive.

Marketing Agreement and Order Program

A committee of nine representing various segments of the industry administers the Federal agreement and order program regulating Florida avocados. A number of subcommittees investigate regulations needed to carry out the intent of the order and act in an advisory capacity to the Avocado Administrative Committee.

During the 1960-61 season the following subcommittees were active: Grades and Packs, Varieties, Maturity, Advisory Board for Maturity, Container Research, Budget and Finance, Election, Fees, Special Fees, Personnel Employment, and Rules and Forms.

In carrying out the terms of the order, the committee prepares an annual report which includes: (1) A summary of the regulatory operations during each fiscal year, (2) an appraisal of the effect of such operations upon the industry, and (3) any recommendations for changes in the program. A review of these publications for seven seasons highlights the regulations undertaken and their probable direct and indirect results (2).

Maturity Regulations

This type of regulation was adopted to encourage more orderly picking and shipping and to keep immature fruit off the market. Shipping dates, weights, and diameters were established for all major commercial varieties and many of the less important varieties. In regulating seedlings and unlisted varieties, the committee used a schedule of weights, seedcoat coloration, and skin color as maturity guides.

While these regulations may have improved the average maturity of the avocados marketed, practices of growers and handlers may have offset some of the advantages that accrue from marketing only mature fruit.

According to the annual reports of the committee, the harvesting and shipping of a particular variety often was curtailed during the week immediately preceding termination of the regulation applicable to that variety. Hence, a larger weekly volume probably could have been sold at satisfactory prices during the last week that the marketing regulation was in effect.

Conversely, the increased supply made available to buyers as soon as the regulations were lifted caused unstable prices and encouraged chain store buyers and intermediary handlers to shift to day-to-day or hand-to-mouth basis while waiting for the price to stabilize. Growers, on the other hand, were encouraged to dispose of their supplies before further price declines took place.

Grade Regulation

This regulation is designed to improve industry returns by restricting the shipment of poor quality fruit.

According to reports of the Avocado Administrative Committee, the grade regulation has primarily consisted of a cull elimination program. While this practice no doubt improved the average quality of avocados moving into consumption channels, it may have also resulted in reduced total returns to farmers.

The relationship between price and quantity in both the prewar and postwar periods has been such that larger marketings have generally resulted in larger total gross returns than smaller volumes. This means that greater total returns generally should be obtainable by selling a larger number of units at a lower price per unit than by selling a smaller number of units at a higher price per unit.

Failure to market the total available supplies would therefore be to the disadvantage of producers as long as the price received covered the cost of harvesting and marketing.

Container Regulations

Before 1954, shippers were using at least 14 avocado containers of varying dimensions. Lack of standardization among containers and frequent shifting from one size to another often resulted in unstable trading conditions at retail and wholesale levels.

In view of these circumstances, marketing agreement and orders were amended in 1955 to include provisions for regulating the number and size of containers used.

A report to the Florida Avocado and Lime Commission suggested that container regulations which encouraged the use of flats and discouraged use of multilayer units have proved beneficial to the industry (3). Wholesalers and retailers in the Chicago and New York markets, for example, were generally satisfied with the standard containers used during the 1956-57 season. The study also suggested that no particular benefits would accrue from using nonstandard flats.

Another aspect of container regulations relates to the standardization of packs within individual containers.

The committee reports suggest that shippers recognize the necessity for standardizing packs if the full benefits of container standards are to be realized.

The Florida Avocado and Lime Commission

The Florida Avocado and Lime Commission was created by the Legislature of the State of Florida in 1955 to have an initial life of 2 years. In 1957, the Legislature voted to continue the commission for another 2 years but in 1959 it was allowed to expire.

The Florida Avocado and Lime Commission was created to "plan and conduct a campaign for commodity advertising, publicity, and sales promotion to increase the consumption of avocados and limes...." To accomplish these purposes Senate Bill No. 849, Chapter 29,833 gave the commission power to disseminate information relating to:

1. The importance of avocados and limes in preserving the public health.
2. The manner, method, and means used in producing and marketing avocados and limes.
3. Costs of producing high-quality fruit.
4. Effect on public health if the industry were to break down.
5. Why producers and handlers should receive a reasonable return.
6. Problem of providing adequate supplies of avocados and limes at reasonable prices.
7. Factors of instability peculiar to the avocado and lime industry.
8. Possibilities of increasing consumption of avocados and limes.
9. Fostering cooperation among producers, handlers, dealers, and consumers.
10. Selection of a distinctive trade name for Florida avocados and limes.

Expenses of the Florida Avocado and Lime Commission were paid from proceeds of an excise tax of 10 cents on each bushel of avocados and limes grown in the State, except those consumed for domestic purposes and on the premises where produced.

In carrying out the purposes for which it was formed, the commission in its first two years of operation employed a public relations firm, an advertising and sales promotion firm, a field representative, and a manager and office staff.

The public relations firm conducted a consumer publicity program, working largely through such channels as the food editions of daily, weekly, and monthly publications, and radio and television stations. The advertising agency carried out its promotion and advertising duties along two lines: (1) A sales promotion program with selected chain stores and supermarkets; and (2) participation in conventions, expositions, shows, and with special displays. The advertising agency also supervised the work of a field representative employed by the commission.

Many factors were responsible for discontinuance of the commission. Chief among these appear to be a series of short crops after 1957, inability to measure the benefits, lack of coordination between the market development work of the commission and markets served by shippers, and a small operating budget.

POTENTIALS FOR IMPROVING MARKETING

In summary, the Florida avocado industry is characterized by a number of economic factors which could have affected its competitive position in marketing. Important among these are:

1. Large changes in production from one year to the next.
2. Lack of complete and up-to-date information on quantities available for sale; volume sold; markets served; and prices received by grade, size, variety, and type of buyer.
3. Homemakers' relative unfamiliarity with the fruit.
4. Uncoordinated selling decisions among growers and shippers.
5. Limiting total marketings which, because of the demand characteristics for avocados, may have resulted in reduced total returns to the industry.

These characteristics imply that the problems involved in developing an improved marketing program and in obtaining equitable returns are not day-to-day problems, nor are they the problems of any one grower or shipper. Rather, they are industrywide and of a long-run nature and will require concerted group action if they are to be coped with most successfully.

Findings of this study suggest that Florida avocado growers and shippers can improve their market position by giving attention to the considerations discussed here.

Production and Market Information

The avocado industry makes crop estimates available to members at the start of the harvesting season. There is no evidence, however, of any organized attempt to maintain an up-to-date on-tree inventory as the season progresses. If growers and shippers are to market most effectively, they must have this type of data upon which to base picking and selling decisions. This is particularly important since supplies and maturity rates vary widely from one season to another. Without such information, growers and shippers are in an uncertain pricing position. This also presents problems in filling commitments as specified.

Establishing a centralized, accurate, and complete market information service should materially assist in obtaining a more effective distribution of sales at improved prices. Lack of such information encourages price cutting and oversupplying or undersupplying individual markets. And lacking dependable market information, growers and shippers are also more or less dependent on rumors.

Advertising and Sales Promotion

Consumers' unfamiliarity with avocados has posed another problem to the Florida industry. According to a consumer survey conducted in 1957, approximately 16 percent of all homemakers in areas encompassing Florida's major markets have never heard of this fruit. In contrast, only 2 percent of all homemakers in the West, which comprises California's major markets, were unfamiliar with avocados.

This factor will assume increasing importance should Florida production be restored to its 1953-57 levels. It is suggested, therefore, that growers and shippers reexamine the merits of advertising and sales promotion as tools for increasing demand for Florida avocados.

As many growers and shippers will testify from previous experience, market development is expensive. It cannot be successful when undertaken on an in-again, out-again basis depending upon the size of the crop. While the demand built up in large crop years may carry over for 1 or 2 lean crop years, an extended period of short crops is likely to necessitate extra effort in subsequent years to rebuild demand.

Various kinds of sales-building methods may be used. Less costly services such as supplying information and recipes to food editors should be considered as basic features of a program, regardless of crop size. When large crops merit special sales efforts, dealer-service work with large-scale distributors and work with advertising companies should be evaluated.

If a decision is made to reestablish an advertising and sales promotion program, the industry might consider directing its initial efforts to the primary markets. Consideration also might be given to working with a selected number of key retail outlets within these markets. Should this approach prove successful, the program could be extended to include other markets and additional distributors.

It is particularly important that the program be backed up with mature fruit of proper grade, size, and volume. The industry must at all times know what it has to sell and fill commitments as specified.

Quality Control

In Florida, grading practices have sometimes been used as a tool for limiting quantities sold rather than to provide buyers with a means of distinguishing between different lots of fruit.

This may have accentuated marketing problems. The relationship between size of crop and farm price has been such that large crops have generally resulted in larger gross returns than small crops. This means failure to market available supplies during the period 1954-59 could have been to the disadvantage of the industry provided the price covered harvesting and marketing costs.

Uniform quality within grades is basic to acquiring a reputable brand name and to obtaining improved returns.

Personnel selling the product must have absolute confidence in its quality. If rigid standards are adhered to, sales personnel can more readily determine the source of any damage which may occur later in a shipment of produce. And rigid inspection and strict standardization aid at the retail level in assuring consumers that repeat purchases of the same product will result in equal satisfaction.

Consideration should be given therefore to establishing a marketing program under which grading procedures would be used to more clearly define the quality of each lot of fruit offered for sale. Buyers must know that differentials exist if they are to purchase on the basis of description rather than inspection. They must also be assured that these standards do not materially vary from year to year.

Coordination of Sales

Orderly marketing, adequate volume, and merchandising skill are required if avocados are to be promoted and sold to the advantage of the industry.

For these reasons, it may be well worthwhile to consider the merits of (1) consolidating sales among shippers or (2) developing a cooperative marketing association among growers. Insofar as the market structure is concerned, these are valid concepts. But competent legal advice should be obtained before embarking upon either program.

A joint sales program has several advantages over the present marketing program. First, sales commitments could be more readily dovetailed with maturity dates and harvesting schedules. Second, it would help reduce the possibility of oversupplying some markets while undersupplying others. Third, a more uniform control over quality, size, and pack could be maintained. And, fourth, promotional activities could be more effectively geared to the supply and demand situation.

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APPENDIX

Appendix table 1.--Number of farms growing avocados in Florida and tree count for counties reporting production in 1959

County	Farms reporting	Avocado trees in Florida			Avocados harvested
		Total	Not of bearing age	Of bearing age	
	Number	*Number*	*Number*	*Number*	*Pounds*
Alachua	3	405	--	405	3,800
Brevard	156	1,831	229	1,602	35,886
Broward	13	604	99	505	13,950
Charlotte	5	22	--	22	1,185
Citrus	1	2	--	2	40
Columbia	1	17	5	12	25
Dade	531	433,191	31,712	401,479	20,141,813
De Soto	29	78	25	53	27
Duval	1	3	--	3	500
Glades	3	10	--	10	200
Gulf	1	5	4	1	25
Hardee	55	97	58	39	150
Hendry	10	41	4	37	678
Highlands	21	5,094	10	5,084	103,240
Hillsborough	120	367	155	212	2,250
Indian River	17	143	93	50	1,331
Lake	70	291	218	73	921
Lee	19	115	50	65	3,620
Manatee	61	285	113	172	3,143
Martin	6	77	75	2	30
Monroe	2	36	--	36	3,000
Okeechobee	10	41	6	35	455
Orange	128	573	335	238	2,731
Osceola	41	113	29	84	2,705
Palm Beach	24	1,068	739	329	4,265
Pasco	26	751	728	23	11
Pinellas	62	534	67	467	21,075
Polk	156	1,811	184	1,627	26,379
Putnam	10	26	16	10	6
St. Lucie	74	310	111	199	4,442
Sarasota	9	145	20	125	200
Seminole	42	107	42	65	320
Volusia	33	94	66	28	152
Washington	1	3	1	2	10
Total-State[1]	1,773	448,523	35,324	413,199	20,378,565

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[1] Includes data for farms not reporting production.

Source: Census of Agriculture, 1959.

Appendix table 2. --Number of Florida farms reporting avocados and tree count, classified by counties and selected census periods

County and item	Florida farms reporting avocados, census of--			
	1930	1940	1950	1959
Dade County				
Farms reporting avocados	324	331	487	531
Trees of all ages	148, 003	101, 293	342, 465	433, 191
Trees of bearing age	113, 727	78, 298	198, 175	401, 479
Trees not of bearing age	34, 276	22, 995	144, 290	31, 712
All other counties				
Farms reporting avocados	499	532	1, 013	1, 242
Trees of all ages	33, 924	30, 048	34, 990	15, 332
Trees of bearing age	16, 649	7, 897	15, 490	11, 720
Trees not of bearing age	17, 275	22, 151	19, 500	3, 612
Total, all Florida counties				
Farms reporting avocados	823	863	1, 500	1, 773
Trees of all ages	181, 927	131, 341	377, 455	448, 523
Trees of bearing age	130, 376	86, 195	213, 665	413, 199
Trees not of bearing age	51, 551	45, 146	163, 790	35, 324

Appendix table 3. --Number of farms growing avocados in California, acreage and tree count for counties reporting production in 1959

County	Farms reporting	Acres	Avocado trees in California: Total	Avocado trees in California: Not of bearing age	Avocado trees in California: Of bearing age	Avocados harvested
	Number	*Number*	*Number*	*Number*	*Number*	*Pounds*
Butte	16	2	246	9	237	16, 500
Colusa	7	(2)	18	3	15	2
Contra Costa	3	(2)	8	1	7	50
Fresno	84	130	6, 470	6, 226	244	9, 785
Los Angeles	704	1, 893	147, 429	21, 578	125, 851	4, 320, 026
Monterey	14	1	50	31	19	500
Napa	20	(2)	29	5	24	100
Nevada	3	5	662	--	662	4, 231
Orange	1, 075	2, 655	208, 684	42, 725	165, 959	7, 730, 541
Riverside	83	431	41, 148	12, 080	28, 068	1, 073, 640
Sacramento	12	1	35	3	32	1
San Bernardino	142	209	16, 269	4, 440	11, 829	656, 580
San Diego	2, 925	14, 056	1, 085, 570	152, 289	933, 281	62, 492, 212
San Joaquin	12	3	271	16	255	6, 000
San Luis Obispo	40	10	781	560	221	4, 260
San Mateo	3	(2)	5	--	5	30
Santa Barbara	386	1, 756	180, 652	62, 685	117, 967	6, 079, 164
Santa Clara	47	5	248	156	92	1, 000
Santa Cruz	24	11	753	705	48	51
Sutter	7	(2)	12	3	9	200
Tulare	76	81	8, 176	7, 398	778	11, 245
Ventura	479	2, 949	327, 986	94, 457	233, 529	10, 696, 071
State [1]	6, 255	24, 200	2, 025, 850	405, 638	1, 620, 212	93, 102, 189

[1] Includes data for counties not reporting production.
[2] Acreage reported in small fractions.

Source: Census of Agriculture, 1959.

Appendix table 4.--Number of California farms reporting avocados and tree count, classified by counties and selected census periods

County and item	Farms reporting avocados, census of--			
	1930	1940	1950	1959
San Diego County				
Farms reporting avocados	860	1,973	2,666	2,925
Trees of all ages	262,585	495,861	836,568	1,085,570
Trees of bearing age	45,823	380,643	469,622	933,281
Trees not of bearing age	216,762	115,218	366,946	152,289
All other counties				
Farms reporting avocados	1,706	2,869	3,362	3,330
Trees of all ages	225,335	366,198	608,535	940,280
Trees of bearing age	85,590	283,274	312,123	686,931
Trees not of bearing age	139,745	82,924	296,412	253,349
Total, all California counties				
Farms reporting avocados	2,566	4,842	6,028	6,255
Trees of all ages	487,920	862,059	1,445,103	2,025,850
Trees of bearing age	131,413	663,917	781,745	1,620,212
Trees not of bearing age	356,507	198,142	663,358	405,638

Appendix table 5.--Acreage and yield of avocados, California, 1929-61

Crop year	Avocado acreage		Avocado yield per bearing acre
	Bearing	Nonbearing	
	Acres	*Acres*	*Tons*
1929-30	1,830	6,069	0.2
1930-31	2,310	6,550	.9
1931-32	3,040	8,572	.9
1932-33	4,217	9,000	.4
1933-34	5,609	9,196	.4
1934-35	7,307	7,993	1.3
1935-36	8,622	6,304	.6
1936-37	10,179	4,097	.6
1937-38	11,226	3,240	.5
1938-39	11,471	2,667	1.3
1939-40	11,930	2,541	.7
1940-41	12,132	2,636	1.2
1941-42	12,285	2,863	1.5
1942-43	12,399	2,995	1.3
1943-44	12,756	2,490	1.7
1944-45	13,077	2,812	.9
1945-46	13,403	2,884	1.8
1946-47	13,565	3,478	1.4
1947-48	12,765	4,443	1.5
1948-49	11,855	6,254	1.2
1949-50	11,292	7,131	1.4
1950-51	12,008	8,464	1.9
1951-52	12,579	9,108	2.2
1952-53	13,566	9,135	1.7
1953-54	15,040	8,023	1.4
1954-55	16,292	6,709	2.8
1955-56	18,036	5,127	1.1
1956-57	19,119	5,348	.8
1957-58	19,794	5,439	2.3
1958-59	20,205	5,061	2.6
1959-60	21,301	4,754	3.3
1960-61	20,045	4,378	1.3
1961-62	[1] 19,700	([2])	[1] 2.5

[1] Preliminary.
[2] Not available.

Source: Compiled from California Crop Production Reports.

Appendix table 6. --Annual carlot unloads of avocados in selected markets, classified by source of supplies, 1950-61

Receiving market and source	Total number of carlots	Number of carlot unloads of avocados by years											
		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
New York, N. Y.													
Florida	1, 879	163	148	164	195	151	189	197	223	118	197	42	92
California	714	10	20	12	24	37	32	2	4	34	209	205	125
Cuba	600	47	78	50	8	27	13	60	69	57	78	110	[1] 3
Total	3, 193	220	246	226	227	215	234	259	296	209	484	357	220
Chicago, Ill.													
Florida	646	9	71	47	49	44	66	77	121	65	48	15	34
California	609	26	18	33	31	14	93	9	18	64	109	100	94
Total	1, 255	35	89	80	80	58	159	86	139	129	157	115	128
New Orleans, La.													
Florida	517	49	62	45	44	31	37	42	75	49	43	14	26
California	358	21	22	15	12	16	39	12	19	27	61	83	31
Cuba	390	43	52	29	34	40	42	40	18	28	38	26	--
Total	1, 265	113	136	89	90	87	118	94	112	104	142	123	57
Los Angeles, Calif.													
Florida	74	--	2	8	--	12	8	22	14	--	--	--	8
California	14, 078	388	771	1, 115	880	734	1, 489	660	957	2, 132	2, 409	1, 690	853
Total	14, 152	388	773	1, 123	880	746	1, 497	682	971	2, 132	2, 409	1, 690	861
Oakland and San Francisco, Calif.													
Florida	162	2	5	15	19	33	22	40	26	--	--	--	--
California	4, 365	191	305	316	260	232	356	204	268	586	694	598	355
Total	4, 527	193	310	331	279	265	378	244	294	586	694	598	355
Denver, Colo.													
Florida	127	--	--	4	16	3	12	24	46	4	10	--	8
California	577	13	34	26	28	33	51	25	24	80	110	104	49
Total	704	13	34	30	44	36	63	49	70	84	120	104	57

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[1] Two unloads from Puerto Rico and one unload from the West Indies.

Source: Agricultural Marketing Service, U. S. Dept. of Agr. Unloads of Fresh Fruits and Vegetables for each city.

Appendix table 7.--Percentage of annual carlot unloads of avocados in selected markets, classified by source of supply, 1950-61

Receiving market and source	Percentage of carlot unloads of avocados by years											
	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
New York, N. Y.												
Florida	74.1	60.2	72.6	85.9	70.2	80.7	76.1	75.3	56.4	40.7	11.8	41.8
California	4.5	8.1	5.3	10.6	17.2	13.7	.7	1.4	16.3	43.2	57.4	56.8
Cuba	21.4	31.7	22.1	3.5	12.6	5.6	23.2	23.3	27.3	16.1	30.8	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chicago, Ill.												
Florida	25.7	79.8	58.8	61.3	75.9	41.5	89.5	87.1	50.4	30.6	13.0	26.6
California	74.3	20.2	41.2	38.7	24.1	58.5	10.5	12.9	49.6	69.4	87.0	73.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
New Orleans, La.												
Florida	43.4	45.6	50.5	48.9	35.6	31.4	44.7	67.0	47.1	30.3	11.4	45.6
California	18.5	16.2	16.9	13.3	18.4	33.0	12.7	17.0	26.0	43.0	67.5	54.4
Cuba	38.1	38.2	32.6	37.8	46.0	35.6	42.6	16.0	26.9	26.7	21.1	--
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Los Angeles, Calif.												
Florida	--	.3	.7	--	1.6	.5	3.2	1.4	--	--	--	0.9
California	100.0	99.7	99.3	100.0	98.4	99.5	96.8	98.6	100.0	100.0	100.0	99.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Oakland and San Francisco, Calif.												
Florida	1.0	1.6	4.5	6.8	12.5	5.8	16.4	8.8	--	--	--	--
California	99.0	98.4	95.5	93.2	87.5	94.2	83.6	91.2	100.0	100.0	100.0	100.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Denver, Colo.												
Florida	--	--	13.3	36.4	8.3	19.0	49.0	65.7	4.8	8.3	--	14.0
California	100.0	100.0	86.7	63.6	91.7	81.0	51.0	34.3	95.2	91.7	100.0	86.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Based on data in appendix table 6.

Appendix table 8.--Avocados: Production and seasonal average price received by farmers, Florida and California, 1947-60

Year	Florida			California		
	Production	Price[1] per ton	Total farm value	Production	Price[1] per ton	Total farm value
	Tons	*Dollars*	*1,000 dollars*	*Tons*	*Dollars*	*1,000 dollars*
1947	2,300	$200	$460	18,600	$400	$7,440
1948	3,100	180	558	14,400	400	5,760
1949	5,000	150	750	15,500	446	6,913
1950	5,500	134	737	22,400	343	7,683
1951	6,500	106	689	28,000	270	7,560
1952	8,700	122	1,061	23,200	348	8,074
1953	10,600	108	1,145	21,300	370	7,881
1954	[2] 11,800	114	1,288	45,200	209	9,447
1955	[2] 14,300	112	1,504	20,000	414	8,280
1956	[2] 10,800	124	1,200	15,800	440	6,952
1957	[2] 14,800	106	1,511	46,300	195	9,028
1958	[2] 4,100	138	511	51,500	168	8,652
1959	[2] 8,000	88	620	70,000	111	7,770
1960	1,800	175	315	35,500	290	10,295

[1] Equivalent returns per ton for bulk fruit at the first delivery point.

[2] Includes 500 tons excess cullage of harvested fruit in 1954, 875 tons in 1955, 1,125 tons in 1956, 545 tons in 1957, 400 in 1958, and 950 in 1959.

Source: Data for years 1947-58 from Agricultural Statistics, 1960. U. S. Dept. of Agr. Data for years 1959 and 1960 from Crop Reporting Board, U. S. Dept. of Agr.

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Pooling and Other Grower Payment Methods as Used by Local Fruit, Vegetable, and Tree Nut Cooperatives. FCS General Report 67. Clyde B. Markeson.

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Economic Considerations in Marketing Sweetpotatoes From the Eastern Shore of Virginia. Marketing Research Report 487. Clyde B. Markeson, Frank W. Bell, and Leo F. Zimmerman.

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